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TRANSACTIONS
OR
THE HIGHLAND AND AGRICULTURAL
SOCIETY OF SCOTLAND

WITH

AN ABSTRACT OF THE PROCEEDINGS AT BOARD AND GENERAL
MEETINGS, AND THE PREMIUMS OFFERED BY
THE SOCIETY IN 1893

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TRANSACTIONS

OF

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

SELECTION AND CARE OF FARM IMPLEMENTS.

By PRIMROSE M'CONNELL, B.Sc., Ongar, Essex.

IN these days when farming is passing through a crisis such as has never happened before, it is necessary for farmers to pay attention to trifles and secondary matters in a way that has hitherto been unusual. The care of their implements is just one of such secondary matters which has been much neglected by farmers, and is worth while paying attention to.

Nothing that I have to say will be very new, but, nevertheless, what is common knowledge is none the worse of being repeated, if only to keep us in mind of it and refresh our memories. Furthermore, I do not practise myself what I am going to preach in the following pages—at least, not all of it—for the simple reason that, though I have been a lover of machinery and a student thereof since my earliest boyhood, yet from the initial expense required for implements, and the fact that one must keep an implement when one has procured it, it is difficult to give up an evil way for a better. But in order that those who have the power and opportunity may avoid certain pitfalls, I gladly give for what it is worth my experience on the subject which heads this paper.

First Care in Selection.

The first and by far the most important consideration regarding farm implements is to take care that you get the proper

kind suited to your work and farm. A statement like this may seem superfluous, but let me give a few cases in point by way of illustration. I have had an opportunity of handling and working for various periods some six different horse-rakes by different makers. It is hardly conceivable the difference one finds in handiness, efficiency, and ease in working between the different varieties. I have worked one which required extraordinary effort to tip—effort such as one could not carry on continuously for a day of ten or twelve hours; and yet alongside of this one, and on the same crop, was one working which I could tip with one finger. They were designed for the same purpose, and presumably both by skilled makers, yet there was no comparison between their efficiency. As the inferior implement was still exhibited at the late Smithfield Show, I presume that there are farmers who continue to buy and use it in ignorance of the fact that there are many better ones in the market.

Another case in point is that of the hay-elevator, a large machine much used in the south of England for stacking hay, by which the hay is carried from the ground up to the top of the stack. Now there are two or three makers who persistently arrange at the wrong end the attachment for the horse that transports it, literally putting the cart before the horse, and this notwithstanding the glaring awkwardness of the arrangement.

One more example may suffice. I have had an opportunity of working with some ten different kinds of ploughs, four of these being American or Anglo-American chills, and out of the lot only some two or three did their work satisfactorily on our land, this being no doubt partly, but not wholly, due to the difference between soils. On the other hand, I have had a digging-plough do splendid work with me, and yet a neighbour only two miles off has failed to get the same implement to go satisfactorily, the maker's man acknowledging his inability to succeed.

I might go on multiplying examples like the above with almost all the common implements of the farm, but these will suffice to show the great care that it is needful to take in the selection of implements. One would think that, in the keen competition between makers, every tool would be more or less perfected by this time, but this is very far from being the case. I have found a knowledge of mechanics and engineering a very great help, but not sufficient, in selecting implements; for the behaviour of a machine in a showyard, when handled by a glib-tongued salesman, and when put into the "dirt and dub" of actual work, are two very different things. The only safe plan is to have a free trial before purchase, and to return the imple-

ment if not satisfied. In the case of one of the ploughs above mentioned, although the agent's man himself could not make it work, yet he insisted that I should keep it and pay for it, and he had to be convinced in a court of law that he was wrong ; so therefore I advise all concerned to have a clear understanding about a free trial of any implement they are not certain about.

It is a notable fact that about every enterprising farmer's homestead there is generally a collection of nearly new unused implements. These are mostly all new inventions or new modifications of older implements, and the owner, in an honest attempt to improve his work and practice, has ordered and tried these with unsatisfactory results, and they are thrown aside as failures. If he had stipulated for a fair trial before purchase, the money would have done him more good by remaining in his own pocket than in being paid away. On the other hand, implement-makers will not go on making and improving machinery unless somebody buys from them, and therefore the pioneers who spend money and time and trouble in working new inventions on their farms are worthy of all praise and sympathy and encouragement. But, all the same, there is an annual saving of money and trouble in taking care to select the most suitable implements at the first.

Books on Implements.

It is unfortunate that there is no book extant—so far as is known to me—that gives information regarding farm implements which would enable one to select the best. There is an American work which treats the subject properly, so far as it goes, but it is old, and not adapted to British machinery. On the other hand, I could mention several works on farm implements published in this country which make no attempt whatever to explain the principles on which machines are constructed, or to give hints to farmers to help them in selecting the best kind. The mechanics of every implement, the distribution of strains and shocks, the calculation of the thickness and disposition of material so as to give strength with lightness, are seldom, if ever, touched upon. The manufacturers of implements sometimes know these things, because they are often engineering experts as well as implement-makers, but books which treat of machinery ought to touch on these matters.

American Implements.

American implements are patterns of ingenuity in the bracing and strutting of the parts so as to give the greatest strength with the least material. Being primarily intended for a drier

climate and lighter crops than our own, however, they were often when first introduced too slim and light ; but now they are improved in this respect, and the last ten years has seen immense strides in the Americanising of our home-made machinery, in addition to the importation of ready-made articles. This is certainly not to be regretted, because every one who has had an opportunity of seeing or working with American and Canadian machinery cannot do otherwise than think that our farm implements here are fearfully clumsy and heavy, even after allowing that Transatlantic manufactures must be a little stronger to suit us.

Patent Laws

However inefficient a machine may be, it has nearly always some good points about it, and it is a thousand pities that all the best points of different makers' implements cannot be combined into one. The patent laws prevent this ; and though it is no doubt just that an inventor should have the fruits of his trouble secured to him, yet it prevents the public from getting the most efficient tools. At the same time, I cannot help wondering why many modifications that are improvements and not now patents are not more widely adopted—such as the reciprocating butt on a string-binder in place of a travelling web ; the one-wheel steerage for corn-drills in place of two wheels ; the self-acting reversing gear on a chaff-cutter in place of an awkward handle ; and so on in twenty similar cases.

Makers and exhibitors must be too busy at shows selling their own goods, one would think, to have time to look round their neighbours' stands to see if there are any hints to be picked up. And the worst of it is that if you go to buy a machine, and want some modification or improvement introduced, the opportunity is taken to clap on a large sum for these "extras," though there is no patent to pay for, and the thing may as easily be made the one way as the other.

Selecting Hand-tools.

Here let me point out a matter of importance in the careful selection of hand-tools. The grain of the wood of the handles should always be set *edgeways* to the direction of the strain exerted in working. A piece of wood invariably shows the concentric rings of the annual growths. These rings in a small piece approximate to flat thin divisions of the wood, and in, say, the ash shaft of a fork, the wood should be set to the prongs in such a way that in lifting, say, a quile of hay these "liths" or divisions may come edgeways to the force.

The reason of this will be understood when it is recollected

that the principle of a girder or a joist is that when the material is made flat and set on edge we get the maximum strength, and each segment of wood in the shaft of a fork or a spade becomes a miniature girder or joist. Many makers know this, and work accordingly; but others do not, and merely content themselves with putting in wood that is free from knots and straight, without looking how the grain of the wood comes.

Capital Invested.

Having invested in a set of implements, the next consideration is the proper use and treatment of them. To understand all that is involved in this, it will be advisable for us to have a look first at the capital invested in the same. I see that some authorities fix the proportion of capital on mixed husbandry farms at about 15 per cent. From my own knowledge I would say that this is about right for large farms, but too little for small ones—at any rate, I do not think that a farmer with £1000 of capital could purchase all the implements he requires for £150. On a stock-farm, of course, the proportion would be very much smaller, but on the smaller arable or mixed husbandry occupations it might be quite 20 per cent.

On a fair-sized farm the value of the implements, therefore, may be from £300 to £400. The working horses, though live stock, ought to be added on, because they are really living implements, excepting in the case of mares kept partly for breeding, but for our purpose it is sufficient to reckon the “dead stock” only. Now the *annual depreciation* on this, *plus* the tear and wear, amounts to a good deal. It may be as low as 5 per cent on fixed mill work and gearing, and as high as 50 on such things as belting and the wearing parts of implements. It will be fair to put the average at 10, however—that is, if a farmer starts with a new set of implements and sells off completely at the end of ten years, the price he gets, *plus* the cost of repairs during those ten years, should equal the original cost.

The *tradesmen's bills* are a very good measure of the annual depreciation, and if a farmer owning £400 worth of implements escapes with a yearly bill of repairs amounting to £40 he has no cause to complain. In my own case this has amounted to as high as 18 per cent, and never lower than 10—the average of several years being about 13. But let us take the smaller sum, and see what can be done to help us a little.

Saving Depreciation and Repairs.

It is evident that £30 or £40 per annum is a serious item on the farm, and if we can reduce it any it is desirable to do so.

The first thing that strikes one after the selection of proper implements is having the *wearing parts* made of *steel*. Steel is now practically as cheap as malleable or cast iron, while it is much stronger, and when tempered or chilled, much harder than either. In the case of such wearing implements as the plough the superiority of steel has been long ago demonstrated; but there are still hundreds of farmers working away with the old, clumsy, rough cast-iron mouldboards, and of course where there is a demand for such, makers will continue to supply them. Again, the comparative strength of steel enables the framework of our implements to be made much lighter than with iron, or even wood; and while the manufacturers recognise this, it is no uncommon thing to find them having steel implements for sale alongside of the old style ones—farmers, to their own detriment, often preferring the old-fashioned clumsy forms. The use of steel framework, steel castings, and chilled steel should be encouraged everywhere, unless there happens to be some special reason in favour of some other material. It is not because they last longer—for if an implement wears too well we never get a chance of replacing it by a new and improved form—but because it is easier on both man and horse, is less liable to breakage in the hands of an incompetent man, and the ordinary tear and wear is reduced.

There is hardly any use in recommending the hiring of careful servants, for we have just to take these as we find them. Possibly the spreading of “technical” education may result in time in the production of men who will take greater care of their tools, but in the meantime we must take care that we select implements strong enough—that is, not too much Americanised—for the rough-and-tumble work of the farm.

Putting under Cover.

It ought to be quite unnecessary to point out that all implements should be put under cover immediately they are no longer required. It would no doubt take a long time for a solid iron tool like a plough or a grubber to be injured by exposure to the weather from rusting; but even with these the “setting” of the screws and the “pitting” of the mouldboards cause great harm and loss, a result which might quite well be avoided with a little care. On the other hand, the wood-work of all implements suffers very much from exposure. It does not actually rot, more especially if well painted, but it is marvellous how brittle and easily broken it becomes if not taken care of.

Everything should therefore be taken indoors as soon as done with. It very often happens that there is insufficient

implement-shedding about a farm, however, and it becomes a question where to put all the implements. If the farmer does not see his way to erect rough-and-ready sheds for this purpose, with poles and thatch, it is quite sufficient to cover them with a heap of straw dressed on the top to turn off the rain. I have seen reapers securely stowed away under a corn-stack which was left to be the last thrashed out in the spring, so that the machinery was preserved during the worst half of the year at least.

Storing of Smaller Implements.

The small implements about the farm—such as spades, hoes, scythes, forks, and a score of others—are the most liable to break, wear out, or get lost or stolen, and it is in their case most necessary to remember the adage, “A place for everything, and everything in its place.” The proper disposal of these is a point which should be insisted on by the master, and a place set apart for them. As the workmen about a farm generally congregate most naturally at the stable, whether horsemen or “odd-men,” the most convenient place for such tools is near the stable. Sometimes a corner of the men’s bothy or an empty stall or recess in the stable can be utilised for such, if there are not too many tools and the space large enough. A large number which are only used at limited times of the year—such as rakes, forks, scythes, &c.—can often be stowed away on the joists overhead in many of the sheds or other offices; but the regular place for the tools should have racks, stands, pegs, and other contrivances fitted up, in which to hold them properly.

The most difficult of the smaller tools or implements to stow away are the shelvements and movable corn-frames of the carts. Each should, of course, be numbered or marked, so as to show to which cart it belongs; but I have never yet seen any satisfactory arrangement whereby these can be packed away easily and tidily, and, at the same time, in a way that any set can easily be got at, so that there is some excuse if we find these piled up against the walls of the cart-shed, or in some of the corners, ready for one to run up against or trip over.

Complete Fixings for each Implement.

While on the subject of carts, I may give one wrinkle which I have learned from experience,—always have a complete set of draught-chains, backband-chain, and all the other little et-ceteras for every horse-drawn implement on the farm. It is often cus-

tomary to have such things as rollers, turnip-sowers, horse-rakes, and so on, with no special set of chains, but worked with loose interchangeable sets—a state of matters causing no end of trouble. It is exasperating to back a horse up to a cart, pull down the shafts, and then find that some one has removed the chains for use somewhere else. It is still more exasperating to take a horse out to the field a quarter of a mile off to start rolling or turnip-sowing, and find the chains gone—perhaps carefully taken home by yourself. It is not comforting to have to toddle home for a fresh set, more especially if your horse is a little “skeigh,” and will not stand tied up to the fence till you come back. Any one who makes unprintable remarks under these circumstances has my sincere sympathy, for I have often come through a similar little episode myself when learning farm-work. This can all be avoided, however, by having a complete set of “fixings” for each implement fastened on so that they cannot be taken off. More than this, a great deal depends on the particular way these are set on or fixed for the ease of the horse, so that each should have its own set made to suit.

Branding Initials on Handles.

All hand-tools should have the initials or name of the owner branded on them. This will prevent any one from helping himself; for it is a great temptation to workers, especially occasional ones, to pick up and appropriate a tool which might be handy for their own private use, or which could be sold, if a quantity of these are left carelessly knocking about, with no apparent reckoning being kept of them. When tools are, as nowadays, turned out by the score with the aid of machinery, it is impossible to be certain of the identity of a particular one unless it is marked in some form or another. Branding is the best marking, because the staining of the wood round the mark makes it almost impossible to whittle it out, and it should be done on a part which cannot be sawn or cut off.

Timely Repairs.

And now again, another thing that must be seen to in looking after our implements is the matter of early or timely repairs. It is a huge mistake to put tools past in a broken or bad-working condition. In nine cases out of ten, the whole thing is forgotten until the particular kind of work comes round once more, and the implements are hauled out just when needed, with the result that they are rushed off to the smithy or foundry, the repairs done hurriedly, and the tradesmen have

more work than they can conveniently do in the time. It ought to be a rule with farmers never to put any implement past until it has been put in thorough order, so that it is ready for work when the time comes again.

It is further desirable to oil all journals with paraffin-oil, so as to dissolve out the old clogged material, and also to grease all clear wearing surfaces for the purpose of keeping them smooth, as otherwise the rust would roughen them.

Oiling.

The smooth working of a machine is greatly aided by keeping the journals properly oiled, while its "life" is greatly prolonged thereby. The best of all oils for this purpose is sperm, but it is too expensive, and there are now some mineral oils which serve the purpose very well. Lard-oil is very good, but unfortunately it congeals too readily in cold weather. The clogging up of working parts with the old-used oil can be readily remedied by using paraffin or petroleum for a time, this acting as a solvent. Personally, I nearly always use a mixture of petroleum with the lubricating oil, say 1 to 6, so as to keep the oil in a fluid condition; but the can must always be shaken up when using.

A great deal has yet to be done by agricultural engineers in the improvement of the bushes and journals on farm machinery—such, for instance, as in designing them to keep out sand and dirt, to withstand the jolting of farm-work, and at the same time be easy to get at to lubricate. There is not yet, so far as I have seen, a good arrangement for oiling—and keeping oiled—the connecting-rod and crank-pin of a reaper or mower; while the greasing of a cart-axle is still as cumbersome an operation as it was in the days of the Romans, many farmers keeping a special tool—called a "greasing-jack"—for this very purpose. Castor-oil is sometimes used as the special lubricant for carts; and why we cannot have oil-holes in the naves or bosses of cart-wheels, as we have in other wheels, is more than I can understand, while some makers I have asked can give no reason for it.

Painting.

The question of painting our implements is one that naturally falls to be discussed under this subject. It of course means that still more money be added to the bill of repairs; but, on the other hand, it ought to save more than its outlay. Paint is put on iron to prevent rust and on wood-work to prevent rotting, while of course it makes our implements look much better and prettier. It is not desirable to have all painted of

one same colour, but where the particular tint is of secondary importance, then chocolate colour is one of the most desirable for general purposes. It is comparatively cheap, it is efficient, and being largely composed of oxide of iron itself, it changes little on exposure to weather.

On the other hand, colours like green or white are very undesirable, because they change so soon and do not wear. "Cart-wheel-red," or red-lead, is efficient and cheap; but it is rather glaring for general purposes, while even it becomes pale in colour and "washed out."

All kinds of paint can now be bought in tins ready for use, and at a comparatively low rate, while the labour of putting it on amounts to nothing. Any farm-workman of ordinary intelligence can soon pick up craft enough, with a few hints as to mixing, putting the final strokes of the brush on all in one direction, having the paint thick enough of itself and free from lumps, but at the same time put on in a very thin coat, going into all seams and corners, and so on.

I would never advise the employment of a regular artisan painter, because I have watched some of these gentry at work, and I find they have so many manœuvres to go through that it makes any active man sick to look at them. They travel to their work in your time in the mornings, potter about getting on their aprons and looking up their brushes until breakfast-time at 8 A.M., so that it is about nine o'clock in the morning before any real work is done. Even then they have so much preparation in the way of scraping off the old paint, putting up cracks, sifting and trying the new paint, that while the final result may be better than anything I or any non-professional could do, yet the immense cost in time and money puts them entirely "out of court." Your professional painter, again, does not consider an article properly painted unless it has got three coats of paint—a style of matters entirely out of the question as regards farm implements.

Sacks.

Part of the dead stock of the farm is represented by the sacks which hold the grain and meal we sell or buy. There is a tremendous tear and wear in these, for besides their liability to rot or be torn, there are the holes made by rats. It seems to be part of what an American would call the "cussedness" of a rat's nature to persist in holing sacks when it can get plenty of food without doing so. If a heap of grain or food is lying on the floor, and the same stuff also filled up into sacks beside it, the rats will gnaw into the sacks all the same. One great care that may be taken of sacks, therefore, is to encourage every one

about the farm to foster their savage hunting instincts in the destruction of these vermin.

Conclusion.

In conclusion, let me point out the extreme desirability of clearing away all disused and worn-out machinery from about a farm. If an implement is being replaced by an improved form, and the old one is not worn out, something may be realised for it by sending it to a neighbour's sale—it may suit somebody. In any case it is worth the value of old iron; and all broken castings, ironwork, &c., should be sent off to the nearest foundry, while the woodwork may be partly utilised for fencing stakes or in rough carpentry, and the residue cut up for firewood. There is nothing makes a homestead look so untidy as piles of old implements lying about—an old cart rotting in one corner, and a worn-out reaper rusting in another. Realise on them in some way or another; it will bring in a little money, while the smartness and tidiness of the place will be greatly improved.

I have known homesteads where the “scraps” of this nature, if converted into money, would purchase a suit of clothes, and yet the farmer was going about with patches on his trousers: verily there are many odd pounds to be saved, to be gained, and even to be picked up lying about, in the implement and machinery department of the farm.

DEPTH AT WHICH GRASS SEEDS SHOULD BE SOWN.

By JOHN SPEIR, Newton Farm, Glasgow.

IT is a common remark among farmers that in certain years their seeds failed to produce a satisfactory braird, and of course caused a corresponding loss the following year. This failure, as a rule, is attributed to bad seed; but during recent years the majority of seeds which have been put on the market have been of fairly good growth, and to my mind this did not account for the thin crops often met with.

In issuing their seed catalogues, many seedsmen gave instructions regarding the manner in which the ordinary field seeds should be sown, which in some respects seemed quite the reverse of what many besides myself had found in our experience to be the best course to follow. These remarks

apply more particularly to the directions given as to how timothy should be sown; and as they were quite contrary to the practice of several whom I looked on as being most successful in the growth of this hay crop, I set about testing the matter in the most reliable way which at that time suggested itself to me.

Germination of Seeds.

When experimenting with seeds in order to test their germination, I had repeatedly found that samples of the same seed, if subjected to different conditions of heat, moisture, or sunshine, gave a very different percentage of germination. This led to the consideration of the conditions to which seeds are subjected, when sown in the ordinary field, and a comparison of these conditions with those to which the same seed is subjected when artificially tested for germination. It was at once apparent that the two conditions were anything but identical.

In a heated greenhouse, it has been found that small seeds, as a rule, germinate best *when just covered*, and which during their period of germination are subjected to a moderate degree of heat—say 60° Fahr.—are regularly supplied with moisture, and moderately shaded during bright sunshine. A common practice is also to cover the seed-pans with sheets of glass, which to a considerable extent prevents evaporation, keeps the temperature more uniform, and gives a slight amount of shade.

In the field these conditions are anything but regularly attained, and consequently the results are in proportion below what they otherwise might be. One year we find the soil friable, and a fine tilth is obtained without any difficulty; but at other times this is not the case, as the soil may be pasty and sticky, and inclined to go into lumps rather than become fine—it may be saturated with moisture, or parched with drought. Under these varied conditions, it is impossible to expect that anything like good results can be realised. Hence the experiments detailed below were begun in order, if possible, to see if they could throw some light on this question,—one to which, in the past, agricultural experimenters have devoted little if any attention.

Details of the Trials.

In the experiments carried out here during the years 1887-89, the ordinary soil of the farm was used, which is a very sandy loam. At the end of that time it was seen, however, that if the tests were in any way to be considered reliable, other than for land of an exactly similar character, other soil

would have to be used. With this end in view, the soil used during the years 1890-1892 was from the top 4 inches of a winter-ploughed field of poor clay. This soil, after being brought home, was intimately mixed, so as to have it uniform in quality, after which it was filled into pots. The pots used during the first four years were $4\frac{1}{2}$ inches in diameter, and during that time the seeds were regularly spread over the whole surface of the pot. It was, however, found in very dry years, and particularly where the seed was buried at the greatest depths, that owing to the heat communicated by the sun to the pots, the earth had a tendency to shrink from the edge of the pot, and that many of the plants came up through this fissure. In order to reduce this chance of error to a minimum, the pots used during the years 1891 and 1892 were 6 inches in diameter, and the seeds were not sown nearer the edge than three-quarters of an inch.

After the pots had been filled with earth thoroughly pressed down, sufficient was scooped out in order to give the requisite depth. The surface having been made quite level, the depth was again tested by placing a straight-edge across the top of the pot, and the foot-rule in a perpendicular position.

The seeds having been carefully counted, were uniformly spread over the surface, after which the pots were again filled with earth up to the brim, the surface being levelled with a straight-edge, as in measuring a bushel of grain. Each pot, after being filled, was sunk to the rim in the soil of the open field, all the pots when in position being covered with a piece of fine wire-netting in order to keep off birds. No water was at any time artificially applied, the seeds being each year, as nearly as possible, subjected to the same conditions as those to which the ordinary crops were subjected in the adjacent fields.

Each year a note was kept of the number of days on which any rain over one-tenth of an inch fell, and also of the number of days it took the plants of each pot to appear distinctly on the surface.

An examination of the tables for each year, or those of the averages for several years, shows that the number of days which are required by the plants to come to the surface corresponds very closely with the proportion of plants yielded by the sowings at the different depths. For instance, in 1887, the total percentage of timothy plants which germinated was 29 fully, while the number of days required to come quite through the ground was almost 30. In the following year, with frequent showers, the average percentage of plants yielded was fully 48, while the time necessary to braird was only $15\frac{1}{2}$ days. It will thus be seen that the quicker the braird, the greater chance is there of a large percentage of plants.

TABLE SHOWING THE PERCENTAGE OF GERMINATION, ETC., OF SEEDS SOWN AT DIFFERENT DEPTHS ON SANDY SOIL AT NEWTON FARM, DURING THE YEARS 1887, 1888, 1889.

Depth sown.	1887. Sown April 1. No rain for first 21 days.		1888. Sown April 27. Showers frequently		1889. Sown April 16. Showers occasionally.	
	Per cent plants.	Days to braird.	Per cent plants.	Days to braird.	Per cent plants.	Days to braird.
TIMOTHY GRASS.						
Surface .	0	31	33	19	21	21
$\frac{1}{4}$ inch .	32	29	71	11	70	14
$\frac{1}{2}$ " .	36	29	75	13	66	15
$\frac{3}{4}$ " .	44	29	55	15	69	16
1 " .	26	29	45	16	70	18
$1\frac{1}{4}$ " .	29	29	37	17	30	19
$1\frac{1}{2}$ " .	23	31	21	18	33	21
ITALIAN RYEGRASS.						
Surface .	3	33	50	16	3	16
$\frac{1}{4}$ inch .	37	31	90	11	92	14
$\frac{1}{2}$ " .	38	25	86	11	76	13
$\frac{3}{4}$ " .	34	25	96	13	83	14
1 " .	35	25	90	14	83	15
$1\frac{1}{4}$ " .	22	31	82	16	71	16
$1\frac{1}{2}$ " .	22	31	75	16	63	18
RED CLOVER.						
Surface .	9	31	8	29	None tested.	
$\frac{1}{4}$ inch .	*64	30	75	20		
$\frac{1}{2}$ " .	72	19	57	21		
$\frac{3}{4}$ " .	83	19	61	23		
1 " .	67	22	56	23		
$1\frac{1}{4}$ " .	...	...	52	25		
$1\frac{1}{2}$ " .	...	...	63	27		

* Two trials.

TABLE SHOWING THE PERCENTAGE OF GERMINATION, ETC., OF SEEDS SOWN AT DIFFERENT DEPTHS ON CLAY SOIL AT NEWTON FARM, DURING THE YEARS 1890, 1891, 1892.

Depth sown	1890 Sown April 1. Showers only occa- sionally.		1891 Sown April 27. Showers very seldom		1892 Sown April 10 Showers occasionally	
	Per cent plants.	Days to braird	Per cent plants.	Days to braird	Per cent plants	Days to braird.
ITALIAN RYEGRASS.						
Surface .	5	23	0	0	19	21
$\frac{1}{4}$ inch .	76	18	43	27	20	21
$\frac{1}{2}$ " .	79	18	53	23	43	19
$\frac{3}{4}$ " .	77	19	67	21	47	18
1 " .	74	19	52	21	42	18
$1\frac{1}{4}$ " .	53	20	57	21	36	18
$1\frac{1}{2}$ " .	49	20	65	21	35	18
PERENNIAL RYEGRASS.						
Surface .	None tested.		0	0	40	19
$\frac{1}{4}$ inch .			62	28	45	18
$\frac{1}{2}$ " .			73	24	46	18
$\frac{3}{4}$ " .			72	22	47	18
1 " .			70	22	46	18
$1\frac{1}{4}$ " .			62	22	33	18
$1\frac{1}{2}$ " .			63	22	28	21
RED CLOVER.						
Surface .	4	21	None tested.		9	22
$\frac{1}{4}$ inch .	71	15			52	16
$\frac{1}{2}$ " .	67	16			70	16
$\frac{3}{4}$ " .	38	18			58	16
1 " .	22	21			38	18
$1\frac{1}{4}$ " .	16	22			20	21
$1\frac{1}{2}$ " .	10	23			6	21
TIMOTHY GRASS.						
Surface .	4	23	0	0	None tested.	
$\frac{1}{4}$ inch .	79	18	21	30		
$\frac{1}{2}$ " .	67	18	41	28		
$\frac{3}{4}$ " .	72	19	32	28		
1 " .	75	19	36	28		
$1\frac{1}{4}$ " .	76	20	25	30		
$1\frac{1}{2}$ " .	66	20	16	31		

TABLE SHOWING THE AVERAGE NUMBER OF PLANTS PRODUCED FROM 100 SEEDS OF ITALIAN AND PERENNIAL RYEGRASS, TIMOTHY, AND RED CLOVER, SOWN AT VARIOUS DEPTHS DURING THE YEARS 1887, 1888, 1889, 1890, 1891, 1892. ALSO THE NUMBER OF DAYS THESE PLANTS REQUIRED TO APPEAR ABOVE THE GROUND.

DEPTH.	ITALIAN RYEGRASS.		PERENNIAL RYEGRASS.		TIMOTHY GRASS.		RED CLOVER.		Average per cent of plants from 116 tests over 6 years with 4 varieties of plants.
	Average plants during 6 years.	Average days to braird.	Average plants during 8 years.	Average days to braird.	Average plants during 4 years.	Average days to braird.	Average plants during 4 years.	Average days to braird.	
Surface .	13.25	18.5	14.7	22.3	13.5	21.	7.5	26.	12.7
$\frac{1}{4}$ inch .	59.6	20.2	60.6	21.3	48.5	21.	65.5	20.2	57.7
$\frac{1}{2}$ " .	62.2	18.	61.	20.	54.5	21.2	66.5	16.9	64.4
$\frac{3}{4}$ " .	63.3	18.3	62.	19.6	50.	22.	59.9	19.	57.7 *
1 " .	56.	18.7	61.	19.7	44.2	22.2	44.4	21.7	53.9
1 $\frac{1}{4}$ " .	55.1	20.3	57.	20.	30.2	23.8	30.5	22.9	48.9
1 $\frac{1}{2}$ " .	47.5	20.7	51.	21.	23.2	25.2	29.6	24.7	40.

A study of the foregoing tables shows that on the surface the braird is most irregular. In a season during which showers happen every other day, a fair proportion of seeds do germinate and grow on the surface; but in a dry year a single plant is not produced. The reason of this does not appear to be difficult to find, and in all probability is caused by the seeds receiving enough moisture from the soil and dews to germinate them; but no protection being afforded from the rays of the bright spring sun, the partially swelled and germinated seeds are damped the one half of the day and parched the next, in consequence of which they soon lose all vitality, and rarely produce any plants. Seasons, however, which are suitable for surface-sowing of grass seeds are, as a rule, too wet to be favourable for other farm crops; but, fortunately, at that time of the year wet weather is not very common.

In a dry season the results are quite the reverse, and the further east and south we go from here I anticipate that these results will become more pronounced. When no rain falls for, say, three weeks or a month after the seeds are sown, those deepest deposited—up to, say, $1\frac{1}{4}$ to $1\frac{1}{2}$ inch—invariably come through the ground before those which have only been covered one-quarter of an inch or so.

Conclusions.

These tests appear to show that for this climate, and for the seeds and soils under experiment for these years, the highest number of plants will be obtained from red clover and timothy when sown at half an inch below the surface, and for perennial and Italian ryegrass when sown three-quarters of an inch below the surface. Over these depths the germination gradually decreases, until at $1\frac{1}{2}$ inch from the surface it is a little less than one-half with clover and timothy, compared with what is given at the maximum point. With the ryegrass, however, the loss through deep sowing is not so marked as with clover or timothy, as from their maximum they do not drop over 20 or 25 per cent, even when sown at $1\frac{1}{2}$ inch deep.

At shallower depths than that showing the greatest number of plants, there is very little loss, provided the plants are covered with a quarter of an inch of soil; but if the covering is shallower, the number of seeds which fail to produce plants is very great, while on the surface few can be depended on at all.

These tests also seem to show that, taking the average of the four plants—Italian, perennial, timothy, and clover (red)—for the past six seasons, there will be produced three and a-half

plants, where the seed is deposited $1\frac{1}{2}$ inch deep, for every plant there will be if it is left on the surface.

It appears, therefore, that where seed is sown on an ordinary harrowed surface, and is covered by harrowing, it is scarcely possible to put it too deep, even although harrows of the ordinary weight are used, and two strokes are given. Even by this treatment it will scarcely be possible to bury much, if any, of the seed at $1\frac{1}{2}$ inch in depth; while a few seeds, in spite of all care possible, will be left on the surface.

What should be aimed at should be, to have all the seeds thoroughly covered, and, if anything, to put them rather deep than leave them on the surface. Seedsmen and others have occasionally recommended that, before sowing grass seeds, the surface should be rolled; but if these tests are to be relied on, this practice would be about the worst possible which could be followed. Rolling should, however, be done after sowing.

METHODS OF REARING AND FEEDING CATTLE IN THE NORTH OF SCOTLAND.

By JAMES BLACK of Sheriffston, Elgin.

THE corner of Scotland that lies north of the Grampians has a fame for the breeding, rearing, and feeding of cattle which makes it worth while to see how it is attained. With considerably less than one-fifth of the whole population on the north side of the Border, and not a larger proportion perhaps of the cultivated land to the north of that dividing line, the eight counties north of the Grampian range contributed to the great London Christmas market of last December some 2000 of the 5000 cattle offered for sale in it, and had their own share fully of the highest prices that were reached.

The animals prepared for the butcher in these counties are not calved and reared within their borders so largely now as they were twenty or thirty years ago, but those that go from them to the best markets in the south are still nearly all the home-bred beasts that have given the northern and north-eastern nooks of the island the reputation for high-class beef which they have attained. Irish and Canadian in-comers are fed pretty numerously, but they go either to supply local requirements or to second class southern markets.

The home and the headquarters of the Aberdeen-Angus cattle may be said to be in the north-eastern counties; and

there also are the shorthorns most in favour at the present time. These provide for crossing the best materials, which are largely and skilfully taken advantage of. The uncertainty of the climate too has much to do with the great attention paid to cattle breeding, rearing, and feeding. Except in a few favoured districts, grain cannot be relied on for the revenues of the farm. Cattle and sheep must be looked to. They are the staple products of the soil in the higher latitudes, and the man who does not know how to bring them out in the highest perfection at the least possible expense may "put the plough on the roost."

I take the eight north-eastern and northern counties one by one, and give examples for each of how the good commercial cattle that build up their reputation are produced and prepared for the butcher.

ABERDEENSHIRE.

In its cultivated area Aberdeenshire is the largest county in the northern half of Scotland. Perthshire has more acres by nearly a half, and a slightly higher rental, but it has not much over half the population of Aberdeenshire. Inverness-shire, the largest county in Scotland, is more than twice the size of Aberdeenshire, but has only about a third of its rental, and not much over a third of its population.

Except on the upper reaches of the Dee, the Don, and the Deveron, the county of Aberdeen is nearly all closely cultivated, forming a solid block of highly farmed land from the Dee to the Deveron, and from Kinnaird's Head at Fraserburgh to Benachie. A fringe of it round the sea-coast, and some haughs and sunny slopes along the lower reaches of the rivers mentioned, are pretty early, but all over the interior the climate is only fairly good. The soil generally is fertile; and as moisture in the summer months is usually sufficient, often plentiful, oats, grass, and turnips grow abundantly. For cattle breeding and feeding scarcely any part of Scotland can equal Aberdeenshire.

The county is divided into districts—the Garioch, Formartine, Buchan, Strathbogie, Deeside, and Donside. There is also another important section of the county that does not come very clearly into either of these divisions—the Turriff district. I have tried to find a representative farmer or two in each of these divisions, who would give in detail the systems pursued in them in the breeding and rearing of commercial cattle, and I have so far succeeded.

Mr Maitland, Balhaggardy.

To take first the Garioch, let Balhaggardy tell its tale. It is in the neighbourhood of Inverurie—an arable farm of 334 acres, occupied by Mr Robert Maitland. It is mostly thin light soil, on various subsoils—sand, rock, clay, pan; exposure south-west and north; height above the sea 300 feet. It is worked in six shifts, including three years' grass, and all the turnips are eaten by cattle, except occasionally that five or six acres are spared for sheep. Excepting about a tenth, the grain grown is oats.

Stock of Cattle.—Seventy to ninety cattle are kept, about twenty of them cows, principally Aberdeen-Angus, with three or four crosses. The sire used is Aberdeen-Angus.

Calf-rearing.—Some twenty calves annually are chiefly suckled, a few being fed from the pail. The suckled calves are weaned in October and November, when they are fed on turnips, with sometimes a little linseed-cake. The pail-calves are kept tight of milk until they are about three weeks old, then they get full quantity—about 6 pints three times a-day, newly milked. Mr Maitland does not believe in skimming milk for calves. When the calves are about three months old their mid-day milk is taken away by degrees; and at five or six months they are weaned, getting a little linseed-cake, with turnips or tares.

Wintering Calves.—Their winter feeding is straw and turnips, with 1 lb. each of linseed-cake, given by the hand in the afternoon before their last feed of turnips. The cake is lessened, and finally stopped a short time before the animals go out to grass.

Young Cattle in Summer and Autumn.—On the pastures there is no artificial feeding. No house-feeding in summer is practised. In August or the beginning of September the six-quarter-olds are taken in, and with tares and early turnips every effort is made to keep up their condition.

Fattening.—They are fed for most part in the course of the following winter, and are sold at weights of 5 to 7 cwt., at from £16 to £22. Mr Maitland says: "I sometimes think it might be more profitable to fatten than to breed. Sometimes I get a fair price for bull-calves, but there are great disappointments in breeding."

Fattening of bought-in Cattle.—Besides fattening his own young cattle, Mr Maitland buys in fifty to sixty every year at twelve to eighteen months old, mostly at home auction sales and markets. They are in about equal proportions, home-bred crosses, Irish and Canadians, rather fewer Irish. In summer their feeding is begun on the pastures, but they get

no artificial stuffs in the fields. The autumn feed is a mixture of beans and oats green.

The winter ration is begun about the middle of October, stall-feeding being preferred. As many turnips are given three times a-day as the animals can consume, with a little cotton- and linseed-cake, and sometimes a mixture of hashed oats about 3 P.M.

The cattleman grooms part of the feeders in the forenoon, part in the afternoon. They are washed when put in to fatten, and occasionally at other times, with soft-soap and a little Macdougall's dip.

The artificial stuffs are sometimes increased a little as the cattle advance towards finish in fattening.

Mr Maitland prefers home beasts when he can get them. Canadians he finds commence to fatten much more quickly than Irish cattle, but consume more food.

Mr Smith, Burnshangie.

Here is a Buchan method—that of Mr James Smith, Burnshangie, near Strichen, one of the central parishes of the Buchan division of the county. The farm contains 220 acres, all arable, and principally loam on boulder clay, about 400 feet above sea-level, with south and west exposure. The rotation is a five-shift one; and the turnips are all consumed by cattle, except about a twentieth part. The straw is mostly from oats, only 8 to 10 per cent of bere being grown, and no barley or wheat.

Stock of Cattle.—Some seventy cattle are kept, the cows numbering twenty to twenty-five. They are Aberdeen-Angus polls, and so are the sires.

Calf-rearing.—From twenty to twenty-five calves are reared annually, most of them sucking their dams singly. A few of the cows take two calves, to allow the dam of one of them to be used for the dairy. Weaning takes place about the end of harvest, the calves being fed on turnips and straw, with 2 lb. each of linseed-cake per day.

Rearing.—This feeding is continued through the winter up to the time of going out to grass. No artificial food is given on the pastures, but occasionally house-feeding is resorted to in summer, the ration being grass with cake, increased in quantity as the animals advance in fattening.

Fattening.—Early six-quarter-olds are housed in autumn, but get no extras till spring. They are sold as they become fat in spring, summer, or autumn. Those not away previously are put in early in the following autumn, say in August, and are fattened as quickly as possible, beginning with tares, which are

followed with early turnips and cake or meals. They weigh generally 7 to 8 cwt., and being mostly polls command the highest prices of the market.

Fattening of purchased Cattle.—Mr Smith buys annually fifteen to twenty home-bred polled crosses to be fattened. The summer feeding of them is sometimes in the house, sometimes on the pastures. The house ration is cut grass, with cake increased as the fattening goes on. No artificial stuffs are given in the fields. The autumn feeding is second crop (aftermath) and tares until the early turnips are ready.

The winter ration, which applies to all his fattening cattle, begins about the end of September in stall. It is 120 lb. to 130 lb. of turnips per day, straw *ad libitum*, and 2 lb. to 7 lb. of cakes or meals, increasing as fattening advances. The turnips are given in three diets at 6 A.M., 11 A.M., and 4 P.M., the extra feeding at night.

The cattle-man is allowed two hours at each feeding-time, and is supposed to clean the cattle in that time, with an afternoon occasionally for a washing or extra grooming of them. And besides this, the animals are washed twice or three times in the end of the year.

Mr Murray, Fauchfaulds.

Now the Turriff district. Mr Murray, Fauchfaulds, farms 213 acres mostly light, but partly stiff clay, subsoil various. He has no natural pastures. The exposure of the farm is two-thirds south, one-third north, and it is about 450 feet above sea-level. The rotation is three years in grass, two white crops, turnips, and a white crop. Straw is nearly all from oats, and the cattle get almost the whole of the turnips. About sixty cattle are kept, including twenty cows, mostly shorthorns.

Calf-rearing.—Annually twenty-four to twenty-six calves are reared, some five or six of them being bought from crofters in the district or at Banff or Macduff, prices varying from 50s. to 80s., according to the season. Pure-bred bull-calves get a cow each. Of heifer and cross calves that are suckled, two are put to each cow, except when the cows have their first calf. Then they get only one calf to bring up. The pail-calves are begun with a pint of milk mixed with water four times a-day. This quantity is increased gradually during three weeks up to 18 pints a-day in three meals. At three months or thereby one of the feeds is turned into skimmed milk, which is made milk-warm by being put, in a tin-pail, into a pot of hot water. No artificial stuffs are used while the calves are on the milk. At about four months the calves are weaned, and are carefully fed on tares or other green food with oil-cake till the end of October.

Rearing and Fattening.—In winter the calves get turnips and straw supplemented with oil-cake for a few weeks until they can eat their turnips properly. Afterwards they get no cake until they come off the grass in the following October, when fattening is begun at once, and in April or May it is finished.

The process of Fattening.—For the last two years Mr Murray has fed only the cattle he bred and reared. Previously he bought every year some eight Irish bullocks, and about the same number of Canadians at from £9 to £12. In his fattening work he gives no artificial stuffs on the pastures, and has no house-feeding in summer.

The winter food begins at the 1st of October or thereby. It is about as many turnips as the animals can consume, with straw, and also with hashed oats for about a month before the fattening is finished.

Besides being groomed once a-day, the feeders are washed now and again, when requiring it, with Macdougall's dip or carbolic soap.

The selling-time is April or May, the home-bred beasts all going at two years old, weighing $5\frac{1}{2}$ to 7 cwt., and bringing £17 to £22. Mr Murray thinks home-bred cattle pay best for the food they consume.

Mr P. Duncan, Balchers.

From almost the same locality here is a somewhat different system, pursued on Balchers by Mr Patrick Duncan. This farm is one of 220 acres of light soil on rotten rock, south-west exposure, and some 250 feet above the sea. The rotation is seven shifts, and all the grass and turnips are given to cattle, the straw being mostly from oats. An average of eighty-five cattle are kept, twenty of them being cows, principally first crosses, with eight to ten pure Aberdeen-Angus. The sire is Aberdeen-Angus.

Rearing.—About twenty-four calves are reared, some twenty of them being produced on the farm, the others bought from crofters at 70s. to 80s. About half-a-dozen cows are set aside for supplying the dairy; the others suckle the calves, most of them bringing up two. The calves do not get full quantity of milk for two or three weeks. Mr Duncan estimates the cost of milking a calf at £4. Weaning takes place about the beginning of harvest, when the calves are seven or eight months old. The youngsters are fed with tares when put in for weaning; and when they return to the park they get green tares to supper, as well as a little oil-cake when the pastures are not fresh and good.

In October the calves go on to their winter feeding, which is

turnips and straw, with a little cake to any of them that may be young or weakly. They get no artificial stuffs on the grass, nor in their second winter.

Their third winter is the feeding one, and they are not sold till they are drawing near to three years old.

Process of Fattening.—At the end of the winter and spring in which they reach two years old, the cattle go to grass in good fresh condition, take on beef on the pastures, and are housed at night early in the autumn to get a feed of half-ripened tares evening and morning. If the season is fine and tares plentiful, the winter feeding does not begin till the end of September, but generally it is resorted to earlier. Stall-feeding is preferred. For two years past Mr Duncan has departed from the system of packing his cattle with turnips. He gives about half a barrowful to a pair three times a-day, with hashed grain and bruised linseed mixed with water. The turnip feeds are at 6 A.M., 1 P.M., and 4 P.M., the cake and bruised grain coming into the ration at 11 A.M. The cattle are groomed every forenoon, and get ready for the butcher in November and December, when within a few months of three years old. Weights 7 to 8 cwt., and prices about £25.

Mr Walker Adam, Corskellie.

Corskellie is in Banffshire, but it is so close to Aberdeenshire, so far projected into the side of it, that it may be held to be as much of the one county as the other. It is essentially in the Strathbogie district, sloping down to the Deveron, with a northern exposure. It consists of 380 acres arable and 40 of pasture, partly on the hill and partly at the riverside. The soil is loam mixed with clay. It is worked in six shifts, with three-years' grass, one half of the grain crop being oats. About a tenth of the turnips is eaten by sheep. Feeding is followed more than breeding and rearing, but of 100 to 130 cattle on the farm, ten or thereby are cross-bred cows, the sire being shorthorn.

Rearing.—Most of the calves are suckled, one per cow, the balance of the milk going to the dairy. Pail-fed calves get unskimmed milk for three months with a little oil-cake, and for six weeks or thereby afterwards skimmed milk is given along with oil-cake. Weaned at about four months, the calves are put on the best grass, and about the beginning of October they are housed and fed on turnips and straw, with about $\frac{3}{4}$ lb. of oil-cake each per day. This is continued all the winter. On the grass no artificial feeding is practised. Housing of six-quarter-olds takes place about 25th August, and the feed at first is tares, with about 2 lb. of oil-cake to each per day.

The winter ration begins about the 1st of October, and fatten-

ing, which has been begun on the grass, goes on without any break, the farthest advanced beasts going to the butcher about November, the others, after wintering, getting finished on the early grass, and coming into the market about June.

Fattening.—Some seventy to eighty cattle are bought every year, home-bred two-year-old crosses, at from £11 to £14, when they can be got, or failing them, Irish or Canadian cattle, generally two years old, at £9 to £12. Fattening is begun on the pastures, but no artificial stuffs are given in the fields, nor is house-feeding practised in summer. When grass is decaying and getting bare at the end of the summer, the cattle are taken in and fed on tares, and sometimes cut grass, with 2 lb. each of oil-cake per day.

About 1st October winter-feeding begins. Stall-feeding is considered best. Straw and a fair quantity of turnips are given, with about 2 lb. of cake. If turnips are scarce they are supplemented by hay, cut straw, and treacle. The feeds are, in ordinary circumstances, cake in the morning and turnips and straw, turnips again in the middle of the day, and turnips and straw in the afternoon.

Grooming is in the forenoon; and washing with Macdougall's dip, afterwards with soft-soap, is resorted to when required.

The cake is increased a little as the fattening gets well advanced, and sometimes oats are given. Animals nearly ripened on the winter-feeding are finished on the early grass and sold in June. Others that do not come so rapidly forward are finished on the grass, and in the autumn for the market in November.

Mr W. A. Mitchell, Auchnagathle.

Auchnagathle is a Donside farm of 280 acres arable, with 100 acres of hill and rough pastures. It is thin sharp soil, profusely mixed with small stones, but part good loam and part clay. With south-west exposure, its elevation is 480 to 900 feet. Rotation is part six shifts, part seven with four-years' grass. All the turnips, except occasionally those far away from the steading, are given to cattle, and two-thirds of the grain crop are oats. Mr Mitchell has stalls for eighty-eight cattle, and keeps twenty-four cows, mostly shorthorns. The sires are shorthorns. The dairy cows are nearly always crosses, with occasionally one or two black polled.

Calf-rearing.—The calves reared number about thirty, a few being bought at from 40s. to 65s. Two calves are put to each cow that can suckle a pair. Thus, with bought calves and those from the dairy, a good many of the cows nurse a couple of calves. Mr Mitchell says: "I recommend confidently the

system I have adopted for some years of nursing two calves by one cow. I cannot do this when a pure-bred dam has a bull-calf, but in other cases a cow should be able to milk two calves thoroughly well. This system has the advantage of saving much labour. More than once I have found lactina a very good food when milk is scarce."

The suckled calves are weaned at from seven to nine months old, and get at weaning the ordinary produce of the farm only. This does not apply to shorthorn bull-calves, which are fed as highly as is judicious with cake, grain, &c. Not many calves are fed from the pail. Increasing gradually in the quantity of milk given to them for the first three weeks, their allowance afterwards is 13 pints per day. At about eight weeks old they are very gradually changed to skimmed milk, mixed sometimes with lactina, more frequently with boiled linseed-cake or boiled oatmeal. A raw egg in it is much approved. The pail-calves are weaned at five to six months old. All the calves are thoroughly learned to eat grass or turnips before weaning.

Winter keep of Calves.—In October the calves are put on their winter feeding; as many of them in sheds or boxes as there is accommodation for, the rest being tied. Their winter ration is yellow turnips and oat-straw, the weaker ones getting cake on till February. Mr Mitchell prefers linseed-cake to cotton-cake, and gives it to the calves in the forenoon, finely broken with a cake-crusher.

Summer and Winter keep of Six-quarter-olds.—The pastures only are the summer food. The six-quarter-olds are housed in October. Mr Mitchell says: "I have found it more profitable to sell two years old cattle in forward condition than to fatten them, prices coming to £15 to £18 in February." Their food in the second winter is yellow turnips until Christmas, then cut swedes with oat-straw. If not sold as two-year-olds, they are put on the richest pastures on the farm in the following summer, and sold either fat or approaching it in the way they will bring the most money. Mr Mitchell finds nothing is more conducive to the thriving of one-year-olds than to make sure of their skins being clean in every respect.

Mr John Reid, Balquharn.

This farm, like the last, is in the district in which the late Mr McCombie of Tillyfour gained such fame as a breeder and feeder of cattle thirty years ago. It is occupied by Mr John Reid, and extends to 275 acres, all arable, of strong brown soil on clay. Its elevation varies from 400 to 800 feet. The rotation is six shifts, with three-years' grass. The grass and turnips

are all given to cattle, and the straw is chiefly from oats. The cattle number eighty to ninety, including twelve to seventeen cross cows—the sire being pure Aberdeen-Angus. From four to eight calves are bought at £3 to £4 each.

Rearing.—All the calves are suckled, two to each cow. At from six to eight months, when weaned, they are taken in over-night and given about $\frac{1}{2}$ lb. linseed-cake. At the end of September or beginning of October they are housed, getting green tares and peas at first, then turnips, straw, and cake. The cake is increased to 1 lb. each by 1st January, and when swedish turnips are begun—about 1st March—it is stopped. Going to the fields generally in May, the one-year-olds get the best grass. There are no other young cattle on the farm, the two-year-olds having by that time been all fattened and sold. The summer food is the grass only. In autumn it is half-ripe tares, peas, and oats, with a few turnips.

Fattening.—When all the tares and peas are finished—about the middle or end of September—the winter ration begins in stalls. It is as many turnips and straw as the cattle can consume, with 2 to 4 lb. bruised oats and barley mixed—turnips and straw at 5 A.M., at 10 A.M., and 4.30 P.M., with oats and barley at 8 P.M. All feeding cattle are once washed, a fortnight after being housed, with soft-soap and warm water; and they are groomed once a-day—the leaner half of them from 8.30 to 10 A.M., the fatter half from 1 to 4.30 P.M.

Punctuality and the time for Artificial Food.—Mr Reid writes: “I pay particular attention to the hours of grooming, as I believe it is in the forenoon that cattle take on condition, and should not be disturbed then.” And on another point he says: “The artificial feed given at 8 P.M. is better than that if a lot of turnips were put on the top of it in the stomach.”

Mr Reid sells his two-year-olds fattened from Christmas to Whitsunday, generally at auction sales, and occasionally at home.

Bought-in Cattle.—In addition to the young cattle bred and reared by himself, Mr Reid fattens as many as he has food for of polled crosses bought in the district markets at two years old, prices from £13 to £17, and of Canadians three to four years old, bought in autumn at £12 to £16. Their fattening ration is very much like that already described as having been bestowed on the cattle of his own rearing,

Mr John Wattie, Milton of Glenbucket.

Glenbucket branches off the Don valley, running quite into the Aberdeenshire hills. Milton, one of the lowest farms in it, is 900 to 1000 feet above the sea, loamy in soil, and 133 acres

arable in extent, worked in six shifts, with three-years' grass. Nearly all the turnips are given to cattle, and all the straw is from oats. Cattle number forty, eight or nine of them being Aberdeen-Angus cows, with sire of same breed.

Rearing.—Bull-calves are suckled, one to each cow. Heifer-calves are generally suckled also, occasionally two to each cow. Two or three calves are bought in at £3 to £4. These and some of the late home calves are fed from the pail, getting a fair allowance of whole milk. If it become scarce by the supply for the house and servants being taken away, then it is supplemented by bruised linseed. Weaning of the pail-calves takes place at about four and a-half months. Bull-calves to be sold in spring get milk all the season; and in the autumn they are fed for a month or six weeks on tares, peas, and green corn. Then in the winter they get plenty of turnips and straw, with a little oil-cake and some bran.

Fattening.—Mr Wattie fattens the cattle calved to himself that turn out not suitable for pure breeding. And he buys in addition, every year in February, a few two-year-old black polled cattle for fattening at from £12 to £15. Pastures only are the summer feeding. About 2 acres of tares supply the principal part of the autumn keep.

The winter ration is turnips and straw three times a-day, as much as the animals can consume, along with a feed of bruised oats per diem, and if turnips are scarce a little oil-cake.

Washing is seldom done; grooming occasionally. The animals are sold as they get ready through the winter.

Mr Wattie says: "Nothing like the home-bred beasts, black polled. They are easily fed, find ready sale, and bring good prices."

Rev. John Watt, Strathdon.

A farther-up Donside farm may be taken—Culquharry, in Strathdon, 960 feet above sea-level. It consists of 55 acres of black loam by the river-side, and 5 of pasture. It is worked in six shifts, and the grain crops are all oats. The cattle number twenty, including five Aberdeen-Angus cows, with sire of same breed.

Rearing.—Six calves are reared annually, the number being made up by purchases in the neighbourhood. After they are three weeks old the calves get whole milk newly milked, mixed with boiled linseed- or oil-cake. At weaning, when four months old, they are fed on grass and cake. They are housed in October, their winter food being straw, turnips, and cake. The cake is given to them once a-day dry, and discontinued a month before they go out to grass.

Fattening.—Fed on the pastures only for the summer, the

six-quarter-olds are taken in in October and get turnips three times a-day, with straw and a little cake once a-day. At two years old they come to 4 cwt. or thereby, and sell at an average of £15.

BANFFSHIRE.

Banffshire is a county very much akin to Aberdeenshire. In respect of soil, climate, configuration, and capacities for the breeding and rearing of cattle, it may be looked upon as a slice off the western side of its big eastern neighbour.

Mr Paterson, Auldtown of Carnousie.

Auldtown of Carnousie is just over the Deveron from Aberdeenshire, on the lower reaches of the river. It extends to 313 areas of good loam on clay-slate, is 300 to 400 feet above sea-level, and has a southern exposure. Six shifts with three-years' grass form the rotation. Turnips are all given to cattle, except a few to about a hundred lambs, which are fed off by the first of March. Three-fourths of the straw is from oats. The cattle average one hundred. The cows, mostly cross-bred, number thirty, the sires best shorthorn, but with an occasional trial of a well-bred Aberdeen-Angus bull, one which has been followed by good results.

Rearing of Calves.—Most of the thirty calves reared annually are suckled. Nine cows are milked for the dairy, their calves being put to the other cows when they are thought to have milk enough to bring up two. Not until they are about a month old do the calves get full milk, which to the few that are fed from the pail amounts to about 21 pints pure from the cow. After the pail-calves are six weeks old, they get a tea-cupful of linseed made into jelly mixed with their milk. Weaning takes place at about five months. Cows with the calves that have been suckled are all housed up if possible by, or before, the 1st of October. The calves for a time go loose beside their dams, and get tares and early turnips till well learned to eat, when they are weaned and put on turnips and straw, with a small allowance of linseed-cake of best quality. This is continued during the winter months till the calves are getting fairly strong.

Keep of young Cattle.—By the 1st of April the cake is taken off. No artificial stuffs are given on the pastures, which are very nearly all sown grasses from 1½ bushel best Ayrshire rye to the acre, with a small quantity of Italian rye, and 6 lb. clover; no natural grasses. No house-feeding in summer. The strongest of the six-quarter-olds are tied up in the last week of

August along with the feeders, and get the same treatment. The others come in with the ordinary stock by October. These stronger and earlier six-quarter-olds are fat by about the time they are two years old. Those calved late in the season are kept on for grazing, and are finished off in the end of the year when rising three years old.

Management of Cows.—The in-calf cows get but a small quantity of turnips, and after calving, and on to the grass, if possible, are kept on yellow turnips, as it is found they do not milk so well on swedes, and their milk, when they are on that variety of turnips, is apt to induce scour in the calves.

Another point of interest in the management is that a few of the earliest and best heifers are served at one year old to drop their calves about April, and if any of the later calved heifers not fit for this are very promising, they are served about January following, to calve in the end of the year. This keeps up the stock, and allows cows to be cleared out to the butcher before they become "sere and yellow," old cows being almost unsaleable nowadays.

Fattening.—Some twenty cattle are purchased annually, good crosses bought in the neighbourhood, rising two years old, at £15 to £18. These get no artificial feeding on the pastures. Along with the earliest and strongest of his own six-quarter-olds they come in for fattening in the autumn and early winter, before Christmas, when nearly three years old. Last November the first draft of this lot brought £26 a-head, and the last half of them were thought to be worth about £24.

Mr Paterson says: "I begin the feeders in early autumn with a mixture of tares, oats, beans, and peas, all green, or only partly ripened, giving no artificial stuffs at this stage. Afterwards, when tares are done, by about the middle of October early turnips take their place, then golden yellows, topped, which are continued until swedes are ready. They are topped and sliced. From the time the cattle are put on early turnips they get per head per day 4 lb. of mixed linseed- and cotton-cake, supplemented by some bruised oats for a month before being finished as Christmas draws near."

The earlier and stronger six-quarter-olds and feeders come to 7 or 8 cwt., and bring £22 to £26. These are the prices now, but in the good times Mr Paterson sold a lot of ten bullocks rising two years old for £32. The cattle are all washed with Macdougall's dip when taken in off the grass, and afterwards when it is thought to be necessary. They get a turn of the comb after the morning feed, and are again thoroughly combed and brushed at 3 P.M.

Mr F. Walker, Craignetherty.

Craignetherty is in the same locality almost as Auldtown of Carnousie. Mr Walker has long been farmer there, and is still quite up in line with the youngest and most advanced in his profession. He occupies 190 acres, about one-eighth of which is natural grass of excellent quality. The arable soil is chiefly light and friable on slaty rock. The haugh-land is alluvial, and about 180 feet above sea-level, the higher fields rising to 350 feet. No fixed rotation is followed. Grass is generally allowed to lie not less than three years; and sometimes when it is broken up several white crops are taken—tares, potatoes, &c.—and in that case turnips are put into it twice before it is laid down again to grass.

Cattle get all the turnips, except a very few that go to sheep. Two-thirds of the straw is from oats, the other third from barley. Cattle number sixty to seventy. Of these, seventeen to twenty are cross cows, the sire a well-bred shorthorn. Calves are seldom bought, as at about £4, when newly calved, they are held to be too dear.

Calf-rearing.—Calves usually number eighteen to twenty. They are mostly suckled, two on each cow, excepting cows that have their first calves, which get only one to bring up. A few are milked from the pail, getting whole milk from the cow all the time. At first they are fed four times a-day with about a quart at each meal. That is increased gradually for some three weeks or a month, when they get nearly a gallon three times a-day, or say 2 gallons a-day. If it is found not to be agreeing with them reduced quantity is given, or it is mixed with skimmed milk for a few days.

Skimmed milk is substituted for the unskimmed usually for a few weeks before weaning, but by no fixed allowance. If well kept till that time, the calves will refuse it. Linseed-cake of the best quality, not exceeding half a pound daily, and dissolved in boiling water, is given with the milk after the calves are a month old, or, better still, one or two eggs—shells and all—twice a-day in their milk.

Weaning.—At about six months old the calves are weaned. Unless very late in being calved, they are all weaned early in September, housed in loose-boxes, and fed with turnips and straw, with 1 lb. each of best linseed-cake daily.

Winter and Summer Keep.—Feeding for the winter is the same as in autumn. An open court is accessible to them, with a supply of good spring-water. No artificial stuffs are given on the grass, nor in the following autumn is anything given to them except turnips and straw until the cattle fattened

for the Christmas markets are off. Then they go into the feeding-stalls, and are finished by about the 1st of March.

Summer Feeding of bought-in Cattle.—Mr Walker buys in spring the lot, about ten, that he intends to fatten for the Christmas markets—two-year-olds, which cost him last year an average of £17. They get no artificial feeding on the pastures, but sometimes they are taken in in July to be fed on cut grass, though more commonly in August to be fed on tares and cut grass. Mr Walker says: "A plan I have adopted with marked success is this,—when I have a field near the steading of good grass, at the time of flies being troublesome, I have put out the cattle all night and taken them into the byres during the day from 6 A.M. till 6 P.M."

Autumn Fattening.—And he further goes on to say: "The autumn food consists of, in September, a few turnips, say a barrowful between two in the twenty-four hours, which will serve for water, along with what they can eat without waste of tares, given at three or four times; the riper the better, and if possible given dry. The early winter ration, when tares go done in October, is swedes, without tops, twice a-day; first a big barrowful of swedes at 5 A.M., then at 10 A.M. a feed of ground oats, or half oats and light barley not kiln-dried. At this time the animals are groomed like carriage-horses, and get fresh straw, or, better, hay. At 3 P.M. another barrowful of turnips is given, or more if it is seen that they need it, no fixed quantity being kept to. The attendant must regulate it. At 8 P.M. bedding is rearranged for the night, and at this hour, after 1st November, 2 to 4 lb. linseed-cake are given to each. "Washing once with soft-soap, or Macdougall's dip, when the cattle are taken into the stalls, is found to be sufficient if they are properly groomed." This Christmas market lot come to about £26 per head.

Fattening Two-year-olds.—After the Christmas lot go away, the six-quarter-olds are taken in hand for fattening and "treated in almost the same way as the Christmas cattle had been, only that they get their turnips sliced, and need more attention as to washing. They get fat about March. To sell them before that time is like cutting green corn. They grow more in the spring months than earlier." They have been bringing lately about £22. When early in the "seventies" cattle were selling best, Mr Walker generally kept on his cattle of his own breeding and rearing till they were about three years old, and got as much as £40 for them.

Mr Ogilvie, Tillynaught, Portsoy.

Mr Ogilvie has not been a breeder of cattle or horses for the

past fifteen years, and has no fixed rotation of cropping. "I grow," he writes, "no wheat, and little barley, oats being the principal crop of grain, and little of them is sold. Having always a full stock of feeding cattle, I use a large quantity of my own oats and seconds of barley, and buy no artificial feeding-stuffs of any kind. In order to make farming pay I found I had to leave the old rut, and—who knows?—I may have to change again."

Mr Robert Turner, Cairnton, Portsoy.

Of Mr Turner much is heard at shows north and south, at fat-stock exhibitions, as well as at those for breeding stock. His farm of 205 acres arable and 25 of wood-pasture is in the valley of the Boyne, near Portsoy. It is strong black soil, chiefly on clay, two miles from the sea, and about 250 feet above sea-level, with south and south-west exposure. The rotation is five shifts. Cattle get all the turnips, and one-half of the straw is from oats. Of seventy-five cattle usually kept, eighteen are cows, crosses, polls, and shorthorns, the sires being always shorthorns.

Calf-rearing.—Some twenty calves are reared every year, a few of them being bought in the neighbourhood at about £3 each. Six are milked from the pail, the others are suckled. The pail-calves are sparingly milked till about four weeks old, then they get full quantity—about 6 pints three times a-day, sometimes more if it can be spared. No skimmed milk is used. Bruised linseed and either oat- or bean-meal are mixed with the milk after a time. These stuffs are well boiled and mixed with the milk immediately before it is given to the calves. At six to seven months the calves are weaned and fed either with tares or turnips and a little linseed-cake. The suckled calves, weaned at about seven months, are fed in the same way.

Wintering Calves.—Generally in October calves are put into covered folds, and the winter ration is begun. It is turnips and straw, with about 1 lb. each of linseed-cake per day put into their feeding-boxes about noon. This is continued till as one-year-olds the animals go to grass.

Summer and Winter Keep.—No artificial feeding is given in the fields, but house-feeding in summer is practised, the ration being grass, cake, bruised oats, hashed barley, bean-meal, and bran mixed. In September all those in the parks are housed, and the fattening of them begins at once. They are all finished off at two years old. Mr Turner says his experience of rearing calves is, that to do it profitably they must be bred from healthy well-bred cows and sires of whatever breed may be selected.

Fattening.—Mr Turner has eighteen to twenty young cattle

of his own to feed every year, and he buys some sixteen home-bred shorthorn crosses, about two years old, at £12 to £16. He gives no artificial stuffs on the pastures, but does a bit of house-feeding betimes in summer, as already described. The cattle he breeds himself are, at six quarters old, put in to fatten in September along with those that were bought in spring. They come off the grass in forward condition. The autumn feed is tares and decorticated cotton-cake.

The winter ration begins about 1st October, partly in stalls, partly in folds or boxes, with not more than two animals in each. The *menu* is about as many turnips as the beasts can eat, some 56 lb. in each feed twice a-day, and when plentiful three times, but feed smaller, with cake and bruised grain in the middle of the day—light barley being found to do well.

All the cattle receiving extra feeding are washed about once a-week with carbolic soap and warm water, and they are combed and brushed daily, generally in the forenoon.

At two years, home-bred heifers weigh about 6 cwt., bullocks 7 to 7½ cwt. Mr Turner thinks good home-bred beasts, when they can be bought at fair prices, pay better than either Irish or Canadian cattle.

Mr William Forbes, Cowhythe.

Cowhythe is a large farm in the same neighbourhood as Cairnton, but close to the sea. It extends to 750 acres arable, with 300 acres of pasture on the sea-braes. The soil is black loam, with part stiff clay; subsoil is clay, and the exposure south. Two rotations are followed, the easy six-shift and seven shifts with three-years' grass and two white crops after them. Two-thirds of the turnips go to cattle, the other third to sheep. Half the grain crop is oats. Of about 230 cattle, some thirty are cows, crosses, and Aberdeen-Angus. The sires are shorthorn and Aberdeen-Angus.

Rearing.—About thirty calves are mostly suckled, cows that are suitable for it bringing up two, young cows only one. Begun with very little milk, the calves fed from the pail get their supply gradually increased till at about three weeks full allowance is reached—5 to 6 pints three times a-day. Whole milk, newly milked, all the time it is, and no mixtures along with it. At five to six months, according to the season of the year, weaning takes place, the milk being gradually reduced, and a little oil-cake given with cut turnips, or clover and sweet hay, their boxes being thoroughly cleaned every day. The suckled calves are weaned when the weather is such that they cannot go out; their feeding at first, in lieu of the milk, being much the same as that of the pail-calves.

Wintering Calves.—All the calves are housed in covered folds,

generally in October, from ten to fifteen of them together, size and strength being taken into account in the dividing of them. They get turnips whole and cut, morning and evening, until they all eat them easily, with about 1 lb. each of oil-cake every day at noon. Every good day they are out and have access to water. This is the winter ration, and it is continued right up to their going into the sown grass fields for the summer. No artificial stuffs are given on the pastures. In the autumn the six-quarter-olds are tied up as soon as the grass gets scarce, care being taken that the summer condition is kept up.

Fattening.—Fattening begins at once. At first, until the turnips are ready, they are put on beans mixed with peas and oats green, spread thinly in the park, or put into boxes. When the time for turnips arrives, yellows are used first, with 2 lb. cake, then cut swedes with the cake continued. With careful feeding heifers get fat by the New Year, bullocks into the spring. They are all sold at two years old from the New Year till April and May, and run from 5 to 7½ cwt., prices varying from £17, 10s. to £23.

The best Crosses and the Rearing of them.—Mr Forbes says: “I find crosses from polled cows and shorthorn sires do best for size and fattening. The other crosses, with Aberdeen-Angus bull from cross cows, are generally harder and less liable to die as calves. I suckle as many as possible, more for the saving of labour than anything else. Hand-fed calves generally do as well as suckled ones—that is, with two at a cow. Singly suckled calves generally keep ahead of the others, but do not show such a difference as would justify the extra cost of every calf suckling its own dam. Cleanliness is a great help in keeping calves healthy. I have them swept clean out every day when they get milk, and after they are weaned, so long as they are in small boxes. I make it a rule to keep them always improving if possible, not too fast, until near the end at two years old. I keep the stots and queys separate in summer.”

Bought Cattle prepared for Fattening.—Mr Forbes buys 150 to 160 cattle annually, some time ago Irish and Canadian, but now home-bred black polled bullocks and heifers when six quarters old. Coming home in August or September, they get no extra feeding for a time, only the foggage in the parks; then they are begun, but not early, with some turnips put out on the grass. When housed, they are fed sparingly on turnips, with plenty of straw and access to water in the folds, getting out for an hour every day when the weather is good. They are not fattened in the winter in which they come to two years old. Two feeds of turnips a-day form the regulation allowance, but if turnips are scarce then one feed has to suffice, the other feed being made up for by a service of cotton-cake, and by treacle

put on the straw. The animals are thus kept merely in a growing and thriving state during the winter.

Fattening bought Cattle.—Fattening takes place chiefly on the pastures afterwards. The cattle are put on the best young grass. As soon as any grass will cut they get it in boxes in the park in which they are browsing. The boxes are 20 feet long and 4 feet wide, with height to suit the size of the animals. Each holds a load. They are used in the parks to be broken up in the following winter, on the worst bits of the land, and near water. A great quantity of cutting grass is thus used early in the season, and by the time the first cutting is done a second is ready. It is supplemented and followed by green beans and peas. From the time this fattening on the pastures begins the animals get daily 2 to 3 lb. each of decorticated cotton-cake put into troughs that are used in winter for feeding in the folds, 2 feet high 8 feet long and 3½ feet wide. A good draft of the feeders is fit for the butcher by the end of the grass in September, when prices are usually at their highest.

The beasts not fully ripened on the grass are tied up early, finished, and sold as soon as possible. Mr Forbes's is a system not common in the north, but it is a successful one.

Mr Charles Kemp, Methercluny.

Methercluny is a high-lying but good well-sheltered farm in the upper district of Banffshire, under the shadow of Benrinnes, and in the vicinity of Dufftown. It extends to 220 acres arable, is about 800 feet above sea-level, soil chiefly dark loam on clay, exposure south and east. Rotation is seven shifts—viz., three-years' grass, two white crops (oats), turnips, and oats or barley. About a third of the grass is consumed by sheep, but the turnips all go to cattle. Of fifty to fifty-five cattle, about a dozen are cows, crosses between Aberdeen-Angus and shorthorn. The sires are shorthorn.

Rearing.—Twelve to fifteen calves are reared, a few being bought in the neighbourhood at from 50s. to 80s. Two-thirds of the calves are suckled, generally two to each cow. The others are milked from the pail. They are brought up to the full allowance of milk in three or four weeks; and this allowance is 12 pints a-day of whole milk newly milked—no skimming. Sometimes it is mixed with linseed-cake ground, which is boiled and then mixed with the warm milk. These pail-fed calves are weaned when twenty to twenty-two weeks old. The suckled ones are weaned when the cattle begin to be housed in autumn. They are taken from their dams and put to a separate part of the farm. All the calves, when weaned, are allowed to feed on the best pastures during the day and are housed at night, when

they get an allowance of about 1 lb. each of oil-cake per day along with tares, and afterwards with turnips. The winter feeding is turnip and straw, with about 1 lb. per head per day of oil-cake on to the end of January; then the cake is discontinued, unless turnips or straw be scarce. No artificial food is given on the grass.

Fattening.—Housing of the six-quarter-olds takes place in the end of August or beginning of September, and fattening begins at once, getting finished by the time the animals are about two years old.

"Ups" and "Downs" in Prices.—Mr Kemp, the tenant, writes: "In my forty-eight years' experience of farming I have sold two-year-olds in the Dufftown market at prices ranging from £3, 10s. to £34. The smaller price was got in my younger days, before feeding was practised in the district. The higher price was obtained in 1874, when my whole crop of two-year-old bullocks averaged £32, 10s. Now the same cattle would realise only £24 to £25. The cattle I breed and feed on the farm weigh at about two years old 6 to 8 cwt."

System of Fattening.—In addition to the twelve to fifteen six-quarter-olds, chiefly bred and all reared on the farm, Mr Kemp buys for feeding every year fifteen to twenty home-bred crosses, frequently black polled. Yearlings come in at £6 to £10; two-year-olds at £12 to £16. Summer feeding is simply the grass. In the autumn, from about the end of August, the cattle for fattening are housed and fed on cut grass and tares, with about 2 lb. of linseed-cake to each per day.

About the middle of October, when grass and tares are done, the winter ration begins. It is straw and turnips, as much as the animals can eat, with cake and ground oats, $1\frac{1}{2}$ to 3 lb. of each per day. The quantities are 60 to 80 lb. turnips per day, with 3 to 6 lb. cake and corn. The feeds are: 6 A.M., cake and an allowance of turnips; 11 A.M., turnips; 4 P.M., oats and an allowance of turnips.

Stall-feeding is practised and preferred, as by it every beast can be dealt with individually. Washing of the animals with hellebore and soft-soap is done when it is thought necessary; and grooming comes in occasionally at 10 A.M.

Mr Kemp has recently been making his six-quarter-olds ready for the butcher by Christmas. He attaches great importance to taking them in early.

Mr Robert Green, Ruthrie, Aberlour.

Ruthrie is a Speyside farm of 176 acres, some 500 feet above sea-level.

Fattening.—Of its fifty to sixty cattle, about eighteen come

every year to be, at six quarters old, ready for fattening. They are crosses, mostly bred and all reared on the farm. Every spring twenty to thirty are bought, home-bred black polled crosses, one-year-olds at £8 to £12, two-year-olds £14 to £16. The summer feed is the pastures only. Six-quarter-olds, intended for feeding off during the winter, are generally tied up about the end of September, and get tares and turnips.

About 1st November the winter ration begins—as many turnips as the animals can eat, and bruised corn mixed with treacle. The feeds are: 6 A.M., turnips and straw; same at 10 A.M., and at 4 P.M., the corn and treacle coming in just before the afternoon meal. For about a month before selling-time the grain and treacle are mixed with about 2 lb. a-day of oil-cake for each beast.

Washing with Macdougall's dip is resorted to when necessary; and grooming is attended to forenoon and evening. The programme is varied a little on Sunday to lighten work.

Stall-feeding is preferred as best suiting the climate. The first draft is sold about Christmas, the last about February.

Mr William M'Pherson, Blacksboat.

Here is the practice on another upper Banffshire farm, Blacksboat—a smaller farm, on Speyside, tenanted by Mr William M'Pherson, who at local shows takes many prizes amongst small tenants, and sometimes beats the big ones. He cultivates 42 acres of light soil, partly on clay, partly on sand, at an elevation of about 700 feet. Working on the five-shift rotation, he gives all his grass and turnips to cattle, and half of his straw is from oats. Of sixteen cattle five are cows, black polled but not pedigreed. Sire, pure Aberdeen-Angus.

Rearing—Six calves are reared annually, three suckled and three hand-fed. The hand-fed trio get up to full quantity of milk in ten days—half a pailful three times a-day. No skimmed milk is used, but after a time oatmeal porridge boiled in the usual way is mixed with the warm milk. All the calves are weaned at six months, and fed on tares and grass.

In the middle of October they are put on their winter feeding of turnips and straw—no cake. No artificial stuffs are used. The pastures are about half sown grass, half natural herbage by the side of the Spey.

Fattening.—When feeding for any special purpose, a supper of tares and grass is given. The six-quarter-olds are housed about the 1st of November, and fattening of them is at once begun. The animals are all fed at two years old, and weigh about 6 cwt., prices from £16 to £20.

Mr M'Pherson writes: "My cattle are all housed, summer

and winter, every night, and I think they thrive better than when left out all night. I approve of keeping my stock thoroughly warm and comfortable during winter, and of attending them regularly with their food, and having their troughs properly cleaned out before each meal."

System of Fattening.—Mr M'Pherson breeds and rears all the cattle he fattens, about five polled crosses every year. He sells them fat at two years old. The previous summer their feeding is the pastures only. In the autumn they get tares and after-math. About the middle of October they are tied up, get as much straw and turnips as they can consume, and some six weeks before selling they get a feed of bruised oats every night. The feeds are turnips and straw at 7 A.M. and 2.30 P.M., and straw at 7 P.M.

The cattle are washed with tobacco-juice when newly tied up, and are groomed every day about noon.

Yellow turnips are used first, then swedes and bruised oats. Mr M'Pherson buys no artificial stuffs.

MORAY.

There is not much breeding and rearing of calves in the lower districts of Moray now. On many of the larger farms it has been given up, except in so far as calves are obtained from the cows required to give milk for the family and the servants. The feeling of many people on the subject is well expressed in the following note by a middle-sized farmer about the centre of "The Laich o' Moray": "Under existing circumstances it cannot pay any farmer so well to rear calves as to buy stirks or older cattle for feeding. I think rearing can pay only on cheaply rented lands not suitable for feeding. I used to keep about twelve cows, and put two calves to each cow. Then about the 1st of August I weaned the calves, and put another calf to the cow, thus making each cow bring up three calves. But the system was attended with a good deal of trouble, and the cows were bad for getting out of season. I think it pays me better to keep cows only to supply the house and servants with milk, and buy all my store cattle."

Moray furnishes examples plentifully of those who believe that in the rearing and fattening of cattle the use of artificial feeding-stuffs pays, and of those who do not. And no mere theorists are they who thus hold directly opposite views and practise them. On the contrary, they number on both sides some of the most skilful and successful farmers to be found in the bright and sunny shire immediately to the north of the Spey.

Mr John Mackessack of Kinloss.

Mr Mackessack owns and occupies 600 acres arable, in addition to about 650 acres of pasture, chiefly links. About half the grass and one-third of the turnips on the farm are eaten by sheep.

The Stock of Cattle.—Cattle number from 100 to 150, all feeding animals bought in, only five or six cows being kept to give milk for the house and the farm-servants. In the end of last November there were in the byres and folds some black polled bullocks six quarters old, recently bought at the very moderate figure of £9 a-head; some home-bred shorthorn cross bullocks same age, recently bought also at £10 to £11; twenty Irish bullocks six quarters old, newly purchased in Perth at about £8; a lot of Canadian bullocks purchased in August at about £10; another lot purchased earlier and nearly ready for the butcher; a third lot of Canadians, bought in at various times and well advanced in fattening; and a second lot of black polled home-bred bullocks bought in the early summer, and almost ready for the finishing touches put on every beast that leaves this farm for the market.

Summer and Autumn Fattening.—Fattening is carried on by Mr Mackessack all the year round. On the grass artificial stuffs, chiefly linseed- or cotton-cake, are given to a certain proportion of the animals. Housing for the winter takes place about the middle of August, sheep eating up the aftermath and the remainder of the other grasses. Fifteen to 20 acres of tares and some early turnips form the autumn feeding of the cattle, along with the usual artificial stuffs, which, until the harvest is concluded, consists chiefly of cake and bruised grain.

Winter Fattening.—Towards the end of September or early in October the regular winter ration begins. It takes shape thus: cake early in the morning, then turnips; another feed of turnips about mid-day; and in the evening a good meal of distillery draff mixed with barley-chaff, bruised grain, and meals of various kinds, with betimes a little burnt ale put over it when it is too dry. This evening feed is mixed up in the morning, and has a good bulk in it to fill up the animals for the long night before them.

Not too many Turnips.—Mr Mackessack does not believe that too many turnips are favourable for feeding. He gives as much straw as the beasts can consume, the two feeds of turnips daily which have already been spoken of, and the artificial stuffs, which are increased in quantity, particularly the cake, as the animals get on in the fattening process. The artificial stuffs used in the course of the year amount to from 50 to 60 tons of cake and about 100 quarters of grain, chiefly maize, rye, oats,

&c., with about 120 bushels of draff weekly during winter. These quantities, however, include the cake and grain used for the feeding of from 900 to 1000 sheep annually.

Best Cattle to fatten.—Mr Mackessack is of opinion that Canadian bullocks, well selected and wisely bought as to prices and quality, decidedly pay best for the food they consume in being fattened. Irish bullocks he has never tried until this autumn. Home beasts, polled and shorthorn crosses, he found, some years ago, left much too little to the feeder, their prices were so high at buying compared with the figures obtainable for beef. Now, however, that they are much cheaper, he thinks they may give the feeder a chance.

Stalls or Folds.—Mr Mackessack is satisfied that stalls are better for horned cattle than folds, even though they are all covered. His animals tied up are groomed every afternoon, but constant efforts are made to leave them alone as much as possible, whether in fold or stall, to let them have the peace and rest so helpful in feeding. About sixty cattle had been turned out fat last season before the end of November.

Mr James Young, Waterton, Duffus.

Differing from Mr Mackessack's practice, Mr Young feeds almost wholly with the produce of his land, and yet at the Elgin Christmas sales in December last he sold fat bullocks rising three years at within a fraction of £30 a-head. He farms about 300 acres arable, mostly heavy loam, with a good mixture of clay; has a six-shift rotation—the "sair six"—grows hay and wheat largely; and gives the pastures and turnips, as a rule, wholly to cattle. They number about seventy, from six to eight being cross cows. The sire is shorthorn.

Rearing.—The calves get no artificial stuffs even at weaning, but plenty of aftermath or tares. Nor do they get anything in winter but plenty of turnips and straw, with a run out for a short time when the weather is good up to the end of November. In the following summer they have always abundance of fresh grass, in the autumn aftermath till about the end of September, then turnips and straw, or tares.

Fattening.—Some fifty to sixty home-bred crosses above one year old are bought in every season at from £8 to £16. These and the young beasts bred on the farm are all fattened. Care is taken to have always plenty of good fresh grass for them in the summer. When the pastures fail in September, they get a few yellow turnips in the parks for some weeks if the weather be good. If it is cold or wet, the animals are housed, and fed on turnips, with tares or straw. Mr Young prefers comfortable

folds for them, believing that home-bred cattle do as well in folds as in stalls, while the labour in attendance is less.

Winter programme in Fattening.—The winter ration is for a time good straw and yellow turnips, then from about 1st December a mixture of yellows and swedes, and after 1st January swedes wholly—as many as the cattle can consume, and plenty of straw. The feeding is twice a-day—first at 7 A.M., next between 12 and 1. Some fresh straw is given in the evening.

The cattle are washed occasionally with Macdougall's dip, well mixed with water, but they get no grooming.

Mr Young thinks it a mistake to disturb the animals with too frequent feeding. He generally gives 2 to 3 lb. of cake per head per day for six weeks or thereby, to finish off with, when he intends selling in winter or spring, but no artificial stuffs, even for finishing, either in summer or autumn.

Mr Alexander Stephen, Coxton.

The next two farms give a similar contrast on a smaller scale. Coxton is in "The Laich o' Moray," about seven miles from the sea, and about 100 feet above its level. It covers 121 acres, one-half sandy soil, the other moss and clay; subsoil, sand and boulder-clay. Worked in five shifts, and without any sheep, the farm provides about 24 acres of turnips for the thirty cattle kept on it, some two-thirds of the straw being from barley. Six cross cows and a shorthorn sire produce usually six calves, and other six are bought—some for milking, and others after being weaned.

Rearing Calves.—The milking of the calves, mostly from the pail, begins with 2 pints of warm milk three times a-day for two weeks. After that age the allowance is increased to 4 pints three times a-day, which is continued for two months. Then about 3 pints warm milk and 3 pints skimmed milk are given twice a-day, with the addition of a little linseed-meal boiled. That is the feed for the third month. In the fourth and fifth months skimmed milk is substituted. It is mixed with linseed-meal, oatmeal, and salt boiled together.

Weaning Calves.—At weaning, about five months old, the calves are fed with tares, getting the use also of the best pastures. Every good day they are out till the end of harvest, and even later, coming in all night to their feed of tares as long as they last, and afterwards to turnips.

Wintering Calves.—The winter ration is plain turnips and straw—no artificial feeding. Some time ago artificial stuffs were used; but Mr Stephen believes that, counting up everything, he has more profit without them. For a few years past

he has cut his turnips for the calves with a machine that sizes the pieces to about $1\frac{1}{2}$ inch by $\frac{3}{4}$ inch, and his experience is that, with the turnips made easy for them to eat in this way, the calves thrive as well without cake as they formerly did with it, when their turnips were merely sliced in the usual fashion.

Fattening.—The pastures of the following summer supply all the feeding the young animals obtain. In the end of harvest housing takes place, and then special fattening proceeds. Some get ready for the butcher early in the winter, even in the autumn, others not till spring. Weights are $4\frac{1}{2}$ to 6 cwt., and prices £14 to £18.

Fattening of bought Cattle.—Some ten additional cattle are bought annually, home crosses, from £10 to £14. No artificial stuffs are given on the pastures. When harvest draws to a close, usually about the end of September, all the cattle are taken in, bullocks put into small folds in pairs, and heifers into stalls. Tares are the feed first given. In a short time it is straw and turnips—as much of both as the animals can consume, with 4 lb. of bruised oats and rye-meal per day, one-half in the morning, the other in the evening; no cake. The first feed of grain is given at 5.30 A.M.; turnips at 6 A.M., again about noon, and once more about 4 P.M., the second feed of grain being supplied along with the last feed of turnips, but in separate boxes. Some years ago Mr Stephen, as already stated, gave up using cake in the belief that it did not pay. He thinks grain is equally effective, and cheaper. He prefers small folds for bullocks, stalls for heifers.

Mr James Muil, Strypes, Lhanbryde.

Here is a different system pursued on a farm of the same size as Mr Stephen's at Coxton, and in the same district, but a little farther from the sea, and higher up. Mr Muil, like Mr Stephen, devotes himself closely to his work, and is a most capable manager in every way. He believes in the use of artificial stuffs being profitable in breeding and rearing, as well as in fattening. Mr Muil's land is partly clay, but chiefly a gravelly loam, of a moory character. He has five shifts, and no sheep. Of thirty to thirty-five cattle, which get all the turnips and oat-straw to a considerable extent, seven are cross cows. A shorthorn sire is used.

Rearing Calves.—About a dozen calves are reared annually, four or five of them being bought from dairies at 40s. to 80s. Some are suckled, some fed from the pail. After the first fortnight the pail-calves get all the milk they can take. "Strong bull-calves," Mr Muil says, "will take nearly double the milk

that cow-calves will take. Cows that are fed on corn and cake and other rich foods, especially potatoes, give strong rich milk, that should be mixed with a little warm water before being given to the calves to weaken it down, otherwise it will cause white scour."

Weaning and after.—Mr Muil does not wean his calves till they are nine months old. For the last month or two they get a little skimmed milk, which is warmed up to the proper heat by oatmeal "brochan" or porridge, pretty hot, being mixed with it. The practice of some people in beating oil-cake fine and mixing it with the milk, Mr Muil does not hold to be a good plan. And "other lazy people," he says "give calves stirabout of hot water and oatmeal, but there is nothing equal to brochan for making calves swell out."

His suckled calves Mr Muil does not wean until he is housing their dams for the winter. The whole of his calves at weaning-time he feeds with "plenty of cake, turnips, and tares." When grass in the fields becomes scarce, he gives the calves tares as long as they last, then turnips, letting them out to a grass-field two or three hours every good day on to Christmas, cake being continued all the time. This is found to make the calves healthy, to improve their coat, and to make them fresh and clean in the skin.

Wintering Calves.—The regular winter ration is turnips, cake, draff, and straw. Giving potatoes and corn to calves is not approved of. It is believed the animals do not thrive so well on the grass after them as after turnips and cake.

Second Summer and Autumn.—No artificial stuffs are given on the pastures until they begin to fade in the end of the season. About the beginning of harvest the six-quarter-olds are housed and fed on tares, cake, corn, &c.

Second Winter.—The regular winter feeding begins a little later. It is turnips, straw, draff, and cake. Mr Muil finishes and sells all the cattle he breeds and rears by the time they are about two years old. He does not mention the prices he obtains for his cattle, but the lots he turned out were marked animals on the market-green of Elgin in old days, as they now are in the auction-mart sale-rings, and command the highest figures going. He holds that his liberal system of keeping his cattle is the most profitable one, just as his friend and neighbour, Mr Stephen, Coxton, an equally capable man, and working under exactly similar conditions, holds with full confidence that he has most profit by doing the best he can with the food that grows on his own farm.

Fattening of bought-in Cattle.—After his own two-year-olds are finished and away about Christmas, Mr Muil buys in six or eight polls or crosses, two to three years old, at about £14

to £16, when they can be got at fair value; if they cannot, Canadians are resorted to, two-year-olds, at £12 to £14. Their fattening ration is much the same as that given to those they have replaced—turnips, as many as the animals can consume, with straw, a little corn and cake, and some draff. The feeds are: turnips at 6 A.M., straw at 7 A.M., bruised oats at 9 A.M., turnips at 11 A.M., draff at 2 P.M., turnips at 5 P.M., straw at 6 P.M., cake at 8 P.M. When turnips are scarce, Mr Muil finds the best substitute in pulping a few of them to mix with cut straw or hay. Draff he finds the next best substitute.

Courts or Stalls.—Small courts he prefers for feeding. Court-fed cattle, he finds, do not need grooming; and he does not approve of washing cattle that are being fattened in courts, as they are apt to get cold. A better plan, he says, is to dust ground pyrethrum flowers along their backs once or twice in the autumn.

Mr Robert Muil, Cotts of Lhanbryde.

This is still a smaller farmer in the same district, who works on a system worthy of notice on account of the success of it, as seen at local shows and public sales. He occupies only 68½ acres arable, mostly sandy soil, on sand. He has six shifts—three-years' grass, oats, turnips, and barley. About one-sixth both of the grass and turnips is eaten by sheep, the rest by cattle.

The cattle kept number sixteen to twenty, six to eight of them being cows, partly shorthorns, and partly shorthorn crosses, the sire being a carefully selected shorthorn.

The suckled Calves.—About ten calves are reared. Three or four are bought, generally from dairymen, only those being selected that are out of good cross cows by either a shorthorn or Aberdeen-Angus bull, price 60s. to 80s. Shorthorn bull-calves are milked by their dams. Shorthorn heifer-calves and cross calves are either suckled, two to each cow, or milked from the pail. In the cases of single sucking, great care is taken to have the cows milked dry three times a-day, after the calves have been put to them, until the calves are a month or six weeks old; then the calves take all the milk. They are weaned generally in September or October when they are six or seven months old, and to the feeding they are to get after weaning they are well used before they are weaned.

The Pail-Calves.—The pail-fed calves, sparingly milked at first, are up to their full allowance in about three weeks, getting all the milk that can be spared for them after that age. Up to weaning-time the quantity is increased if the supply will admit of it. From 12 to 16 pints per day they are allowed in three

meals. Any youngster specially promising for showing gets as much as it will drink after being gradually worn on to it. Weaning takes place at from five to eight months, according to circumstances. Whole milk newly milked is given all the time, except that towards weaning skimmed milk is so far substituted. It is mixed with meals from linseed, barley, pease, rye, or oats. They are made into porridge, seasoned with a little salt and treacle. At feeding-time a lump is broken off with the hand or with a stick and mixed with the milk. At weaning the feed is linseed-cake, tares, or grass, and sometimes a little mixed meals made into brose.

Wintering Calves.—Housing takes place generally in October, when the calves are fed with turnips, straw, linseed-cake, and a little grain, getting out a short time daily for exercise. Short-horn bull-calves get each 3 to 4 lb. linseed-cake, $1\frac{1}{2}$ lb. bran, 2 lb. barley-meal, $\frac{1}{2}$ lb. pease- or bean-meal, and $\frac{1}{2}$ lb. rye-meal per day. The bran and meals are mixed together, and a little salt and about $\frac{1}{2}$ lb. of treacle added; then the whole is soaked with boiling water, and allowed to cool, afterwards mixed with chaff, and given to the calves morning and night. Cake is given morning and mid-day. This feeding is continued all through the winter up to the grass.

Summer Keep.—On the pastures no artificial stuffs are given when grass is plentiful, except to any beasts intended for showing, which are fed pretty much the same as in winter. Short-horn bull-calves at ten to fourteen months old sell at 20 to 30 guineas; cross heifers at calving, twenty-one to twenty-four months old, at £15 to £18; cross-bred stirks twelve to fourteen months old, £9 to £12.

Things to be attended to.—Mr Muil says it is most profitable to breed from good milking cows, dams and sires being of healthy families; that it is important to feed the calves steadily from the first, as any little neglect spoils the constitution; that to bring them out right they should be cleaned pretty often, so that they may not be restless. His bull-calves are washed about once a-month with Macdougall's dip, which in about three days after application is with soap and water washed out of the hair. To keep the calves sound in the legs they get plenty of exercise. All the animals have rock-salt conveniently placed for them to lick; and young beasts getting rich mealy foods have water handily accessible.

Does all this Pay?—It may be asked, Does all this pay? It is only stating what is very visible and well known in Mr Muil's district, to say that he and a well-brought-up, industrious, capable family, live comfortably and prosperously by their small farm, working it in a way that is the admiration of every one who sees it.

Mr George Petrie, Pitairlie.

Pitairlie is on the side of the Lossie between Elgin and Lossiemouth, the higher tides reaching nearly up to it. It contains 230 acres, clayey, loamy, and sandy, on sandy subsoil, with 20 acres of river-banks. Five-shift rotation is followed, oats and wheat being about equal in extent, and barley equal to both. Fully sixty cattle, usually ten of them cows, shorthorn and polled crosses, get three-fourths of the turnips, the other fourth and the winter grass being eaten by sheep. The sire is shorthorn.

Calf-rearing.—From fourteen to sixteen calves are milked, and eight or ten are bought after they are weaned. Those taken in for milking come from dairy-keepers at 50s. to 60s., the weaned ones from crofters, who cannot winter them, at £5 to £6, 10s. The calves are mostly suckled. Two calves are put to each cow until the cows left without calves are sufficient to give milk for the dairy. Then beyond this, as each cow calves, a newly dropped calf is bought to put to her along with her own. And if there is difficulty in keeping up the supply of milk for the dairy a couple of cows at calving are purchased, the two calves being put to the last calved one. Thus two or three spare cows have to be fattened in the winter.

Any calves milked from the pail get a small quantity till about two weeks old, and from that time till they are six weeks, about 4 pints warm milk three times a-day is their allowance. After this age half their milk is skimmed. It is made milk-warm in a pot, and when it is mixed with the newly milked half, generally a little gruel, made from oil-cake and meal boiled together in water, is added, making about half a cogful altogether.

Weaning and after.—The pail-calves are weaned when four or five months old; the suckled ones usually about harvest, when additional milk is required for the harvest-people. The cows are taken in, and the calves put on the aftermath. The calves go out all day till the beginning of November, but they get turnips in the house at night for a month before that time.

Wintering Calves.—In November the winter feeding begins—1 lb. of oil-cake each in the morning and as many turnips as the calves can eat. They are kept in a very comfortable house. The cake is stopped about the end of February.

Summer Feeding.—When grass is up to feed them properly they go out to the fields, not to the natural pasture, which is eaten by the cows. No artificial feeding is given in summer.

Winter Fattening.—Early in September the six-quarter-olds are taken in and fed on turnips and straw until about the

beginning of December, when special fattening begins and is finished in spring.

The Process of Fattening.—Early in September, when harvest operations admit of it, the cattle are taken in, the more growing ones put into folds, those to be fattened soonest put into stalls where they take on beef faster. They get straw and as many turnips as they can consume, and about the beginning of December there is added a feed of hashed rye and oats, and a small quantity of oil-cake mixed with it—3 to 4 lb. of the mixture to each animal. The feeding with turnips is twice a-day. There is no grooming or washing except when specially required. Selling of bullocks takes place in February or March at two years old, the weights being 6 to 7 cwt., sometimes more, and the prices £16 to £22. The heifers are ready for the butcher earlier. When well kept in winter as one-year-olds, they get fat on the grass in June or July, and are sold then. Outside the cattle he rears himself, however, Mr Petrie buys home-bred crosses as his keep will allow, about six quarters old, fattens them, and sells them as they get ready.

Mr James E. Colvin, Wester Manbeen, Elgin.

Feeding alone is the cattle industry of this large low-country farm of 540 acres, mostly of sandy loam. To suit variations of soil three different rotations are followed—viz., five, six, and seven shifts. A considerable proportion of the turnips are given to sheep.

The Cattle Stock.—Some ten cows are kept to supply milk to the house and servants. About twenty Irish calves are bought and kept on until fattened at two years old. The bulk of the stock, however, consists of Irish and Canadian cattle, chiefly Canadian, especially lately. Of these about 120 are purchased annually. The Canadians are bought mainly in Glasgow at three years old, prices £11 to £12. The Irish come from Falkirk. Last autumn a good many home beasts were purchased, chiefly polled six-quarter-olds, at £7 to £9.

Fattening.—The main part of the fattening is done in the winter—horned cattle in stalls, polled cattle in folds. The regular winter ration begins about 1st November. It consists of as many turnips and as much straw as the animals can consume, with some artificial stuffs for six weeks before selling to give a finish to the fattening,—cake or grain it may be, or both, according to their relative prices. The feeds are twice a-day, at 6 A.M. and 2 P.M.—a “skullfull” and a-half to each animal at every meal. The fine old-fashioned wicker “skulls” are still in use here. It does an “old hand” good to see them, especially to see them holding an honoured

place in the work of one of the finest steadings in the north of Scotland.

The tied-up cattle are groomed, and washing with carbolic soap is practised when it is deemed to be advantageous.

Mr Colvin says: "I have found that Canadian cattle have paid better for the past few years than either Irish or home-bred beasts, as they can be bought at less money, and they are healthier than Irish cattle, and as a rule fatten more quickly.

Mr J. Brown, Miltonhill, Alves.

Another low-country farm, this is wholly devoted to fattening in its cattle. The extent is 204 acres arable; rotation partly five, partly six shifts. All the pastures and turnips go to cattle.

The Stock of Cattle.—They vary from sixty to eighty, only three of them being cows. Mr Brown buys about 150 cattle every year. Of these perhaps thirty are Canadians, purchased at Aberdeen and Glasgow, three to five years old, £11 to £15, average about £12, 10s. The others are home-bred polls and crosses, bought in when six quarters or two years old, £10 to £15. Those about £13, 10s. do best.

Summer Fattening.—The summer fattening is on the pastures. With the first flow of the grass Mr Brown prefers corn to cake. After 1st July he gives 2 lb. a-day of cake to all two-year-old cattle if they are in forward condition, putting it into troughs in the parks.

Winter Fattening.—The winter ration begins about the middle or end of September. Stalls are favoured if artificial stuffs are used; folds if only turnips and straw are given. Mr Brown writes: "I never give more turnips than a beast will eat clean out in about half-an-hour. This my cattle get twice a-day, with as much straw as they will eat put into the haik twice a-day, after making sure that the haik is emptied before any more is put into it. To this allowance of turnips and straw is added 2 to 3 lb. of cake for each beast daily. When fattening is begun, I give turnips sliced at 6 A.M., corn and cake at 11 A.M., turnips again at 3 P.M. For the last month or six weeks before selling I give two feeds of corn and cake daily at 11 A.M. and 8 P.M., about 2 lb. corn and 2 lb. cake each time. The cattle are washed with Macdougall's dip when not resting well, and groomed daily when there is time for it. Selling takes place whenever a buyer turns up to give near the expected price, mostly at home, but occasionally at auction sales to try values."

Best Cattle to feed, and what specially to attend to.—"My experience is," Mr Brown continues, "that there is more profit in

Canadian cattle for feeding than in any others, although home-bred crosses, if good sorts, are not far behind them. Irish cattle require to be fed from calfdom onwards if they are to pay. I do not like Irish cattle. I find that it is essential to success in fattening that attention be paid to not giving the animals too much of anything at one time, so that the food will not lie before them; that their troughs and haiks be cleaned before every meal; that the cattle be kept with as much appetite as will make them look for every meal when the time comes for giving it. As much depends on the cattleman as on the sort of cattle to be fed. He should be regular in giving animals their food, and treat them kindly. If they are afraid of the cattleman they will not thrive."

NAIRNSHIRE.

The county of Nairn is small. It resembles Moray in many ways, but has more breeding and rearing of cattle in proportion to its size.

Mr R. Anderson of Lochdhu.

Lochdhu is a large farm of 800 acres, all arable, owned and occupied by Mr Anderson, one of the best known agriculturists in the north of Scotland. It is mostly light soil on sand, some 200 feet above sea-level, and close to the town of Nairn. It is worked in six shifts—viz., three-years' grass, oats, green crop, barley. One-third of the turnips is consumed by sheep, the remainder by cattle. No wheat is grown; oats and barley in about same proportions. From eighty to one hundred cattle are kept, ten of them cows, a few shorthorns, the others crosses. Sire, shorthorn.

Rearing and Weaning Calves.—Ten calves are reared, none of them bought. The shorthorn calves are suckled, one to each cow; the others are fed from the pail with new milk until they are six weeks old; after that they get skimmed milk, with a little linseed amongst it, until they are six months old, when they are weaned. Their feeding then is 1 lb. of linseed-cake three times per day—morning, noon, and night—with a little hay. The milk allowance to the pail-calves is 9 or 10 pints a-day. The skimmed milk is not warmed, but the linseed is boiled some little time before being used.

Wintering Calves.—Both suckled calves and those fed from the pail are put on winter feeding at six months old. It is turnips, linseed-cake, and oat-straw, the quantity of cake being 1 lb. three times a-day. This is continued up to the grass.

Summer Keep, &c.—No artificial stuffs are given on the pastures if grass is plentiful. When house-feeding is practised in summer—which is not often if the pastures are good—it consists of cut grass with a little hay.

The housing of the six-quarter-olds takes place about the end of September, and fattening begins at once.

Bought-in Cattle.—Mr Anderson buys a large number every year, partly home-bred, partly Canadian and Irish. The home-bred animals are shorthorn, polled, and Highland, or polled and Highland crosses with shorthorns. They are from one to three years old.

Fattening.—Fattening begins on the pastures in summer. When grass is plentiful very little artificial food is given along with it; but if scarce it is supplemented with 2 to 3 lb. of linseed-cake per day. The cattle are housed about 1st October in courts. Small courts are preferred to stalls. The animals get turnips, linseed-cake, and oat-straw. The winter ration is the same, the turnips being as many as the cattle can consume. The feeds are: at 6 A.M., either straw or hay; at 8 A.M., turnips; at 2 P.M., turnips; at 6 P.M., linseed-cake. If turnips are scarce the artificial foods are increased. The cattle are groomed after getting the last feed of the day at 6 P.M., but not washed. As they draw near to finishing, the linseed-cake is increased a little. Two-year-olds when fattened come to 10 to 12 cwt. live weight, and bring 35s. to 38s. per cwt.

Mr Anderson's experience is that home-bred cattle pay best for the food they consume in being fattened.

Mr John Joss, Budgate, Cawdor.

Budgate is a moderate-sized farm of 140 acres in the valley of the Nairn, some four miles inland from Lochdhu, and 250 feet above sea-level. It is light loam much mixed with small stones; subsoil, gravel. The exposure is north, and the rotation five shifts,—one-half the grain being oats, the other barley. Fifty to sixty cattle eat about two-thirds of the turnips, sheep getting the other third with the winter grass. Eight to twelve cows are kept, polled and mostly crosses. The sire is Aberdeen-Angus.

Calves.—Fifteen to eighteen calves are reared, those not calved on the farm being bought in the district, chiefly from dairies, at 40s. to 60s. when young, £5 to £8 when older. They are partly suckled, partly fed from the pail. The pail-calves, by the time they are three to four weeks old, are brought up to their full quantity of milk, which is 20 pints a-day. Whole milk, newly milked, they get all the time, with a little calf-meal in it, mixed with boiling water, when they come to be

a few months old. At six months all the calves are weaned, and are then fed with grass, tares, and a little cake.

Wintering Calves.—Housing is in October, and then the winter-feeding begins. The food now is turnips and straw, with a little distillery draff mixed with chaff, and steeped in burnt ale. This mixture is given in the middle of the day, with about half a pound of cake to each. Feeding in this fashion is continued up to the grass.

Summer Keep.—On the pastures a little draff and burnt ale are given. No house-feeding in summer is practised. Housing takes place in September, and fattening begins at once.

Fattening.—Mr Joss has some fifteen to seventeen six-quarter-olds reared on the farm for fattening every year, and in addition to these he buys about twelve home-bred six-quarter-olds, polled crosses, at £10 to £12. When the grass begins to fail in the autumn, the draff and burnt ale, given on the pastures, are supplemented by a small allowance of tares. The regular winter-feeding begins in September in stalls. It is as many turnips as the cattle can consume, with hay or straw and artificial stuffs. The feeds are: 6 to 7 A.M., turnips; 10 to 11 A.M., mixture of cut hay, bran, and Paisley meal, steeped in burnt ale; 3 to 4 P.M., turnips; 6 P.M., about 2 lb. oil-cake to each.

The cattle are washed with Macdougall's dip just after being put in, and generally groomed every day.

Oil-cake is a little increased as fattening comes near the finish. Sales take place occasionally at auction-marts, but more often at home, from November till April. Weights are 5 to 6 cwt., and prices about £15 to £16.

Mr George Mill, Piperhill.

Mr Mill has a distinctive method of his own. He farms 124 acres, one-half of it fairly good black soil, the other half light and porous; subsoil gravel, exposure northerly, elevation 80 feet. In a five-shift rotation cattle get all the turnips except about a third. One-half of the straw is from oats, the other from barley. Of thirty-six cattle kept, sixteen are polled cross cows, and the sire is pure Aberdeen-Angus.

Rearing.—Sixteen calves are reared, and all suckled. Two go to each cow, so that eight cows suckle calves and eight are milked. As to this milking, a note is added afterwards. When six to eight months old, or when the cows are tied up for the winter, the calves are weaned, the early ones thus getting milk longest. Their feeding then is cut turnips, straw, and oil-cake. To this in their winter ration there is added cut straw and chaff, steeped with treacle-and-water. The quantity of oil-cake

is about 1 lb. per head per day up to the end of February, afterwards $1\frac{1}{2}$ lb.

The bullock calves reared thus are all sold in April, when about a year old, at an average of £13 a-head.

Milk, Butter, and Cheese.—And Mr Mill makes something of the eight cows which he milks. Their milk, after supplying the household, servants, and about a dozen families, is manufactured into butter and cheese. The money realised for butter and cheese is about £7 per cow per annum. The cows after calving get an allowance of bran and oil-cake twice a-day until they are about ten days on the grass. The eight cows that suckle the calves are not milked after the calves are weaned.

Mr James Russell, Blackhills and Clune.

Up among the Nairnshire hills—on Blackhills, 160 feet above sea-level, and on Easter Clune, 360 feet—Mr. Russell occupies 360 acres arable, and has about 700 acres of rough natural pastures. The soil is black loam, with northern exposure. The rotation is five shifts, and about one-fifth of the grass and one-third of the turnips are eaten by sheep; cattle consume the rest, and more than half of the straw is from oats. Of about eighty cattle twenty are cows, Aberdeen-Angus and Aberdeen-Angus crosses, the sire being Aberdeen-Angus.

Calves.—From eighteen to twenty-six calves are reared, part of them being bought from neighbours at 40s. to 65s. About half of the calves are suckled, the others being pail-fed. These pail-calves get very little milk to begin with, but it is increased to the full allowance when they are about four weeks old, and that allowance is the liberal one of 16 pints a-day. For most part whole milk newly milked is continued all the time. When the calves are about six weeks old, a small quantity of oil-cake is added to it. The oil-cake is ground small and mixed with the milk.

Weaning and after.—At weaning, when five to six months old, the calves are put on foggage or good grass, and are allowed about $\frac{3}{4}$ lb. oil-cake each per day. About the 1st of November they are put on turnips, and the cake is continued with oat-straw. Whether the cake is to go on up to the grass or not depends on the condition of the calves and on the supply of turnips. No artificial stuffs are used on the pastures. Between the 10th of October and 1st November the six-quarter-olds are housed, and fattening is generally begun at once.

Bought-in Cattle and Fattening.—In spring and early summer some twenty to thirty home-bred polls and crosses are purchased at local sales at from £7 to £12. No artificial food is given on the grass, but when pastures begin to fail in autumn

a small quantity of oil-cake is allowed. Between the middle of October and the beginning of November the winter-fattening begins. Heifers go into stalls, bullocks into folds. The winter ration is as many turnips as the cattle can consume, with oil-cake and bruised oats—two feeds of turnips a-day, with about 2 lb. of oil-cake and the same of bruised oats in the morning, and bruised oats again later in the day.

No grooming or washing is done. Heifers come to about 4 or 5 cwt., and bring £12 to £16, 10s.; bullocks to about 5 or 6 cwt., and bring £15 to £20.

INVERNESS-SHIRE.

More breeding and rearing of young cattle is found, even in the low-lying portions of Inverness-shire, than in Nairn and Moray on the one side of it, or Ross on the other.

Mr J. Shearer, Mains of Croy.

Mains of Croy is just over the march from Nairnshire, a farm of 180 acres, all arable, part of it black loam, part sandy loam, some moss, some moory. It lies from 200 to 300 feet above sea-level, has shelter from south-east round to south-west, but is open and exposed to north and north-east. The best land is worked in five shifts, the worst in six, with three-years' grass. Cattle get about two-thirds of the turnips; and about two-thirds of the straw is from oats, one-third from barley. The cattle number forty-five to fifty. Nine are cross cows, Aberdeen-Angus sires being used for the horned cows, and shorthorn sires for the polled cows.

Suckled Calves.—From eight to ten calves are reared, part being bought from neighbours or at auction sales, prices 35s. to 70s., at two or three weeks old. About half of the calves are suckled, two to each cow. They are put to the cows three times a-day—morning, noon, and night—and taken away as soon as they finish their feed. At the beginning of their days, however, they are taught to drink out of the pail. This is found to be of great value when the cow has too little milk for the two calves, and also at weaning-time.

The early suckled calves are weaned at about six months, the later ones at seven months. It is done gradually, by reducing them first to two meals a-day, then to one. After two or three days on the one feed from the cow, they get warm drinks of skimmed milk, with some linseed-meal well boiled put into it; and they are allowed besides about half a pound of oil-cake each per day.

Pail-Calves.—The pail-calves are kept short of milk and hungry for the first week, getting only about an imperial pint three times a-day. In the second week this quantity is doubled; and so on till the full allowance of 9 to 12 pints in three meals daily is reached. But though this is the regulation full quantity, it is modified according to the age and size of the calf and the richness of the milk. Much must be left, Mr Shearer finds, to the good sense and capacity of the attendants.

No skimmed milk is given to the calves. When they are about three months old the warm milk is mixed with porridge, made of equal quantities of oat- and linseed-meal well boiled. The porridge, when put into the milk, is well broken and mixed by the hand; and as the calf gets older, and milk becomes scarce, the quantity of the porridge is increased, care being taken not to give too much. The pail-calves are weaned at five to seven months. It is found that early calves do not require milk so long as late ones.

Calves at and after Weaning.—All the calves at weaning get tares or cut clover at night and about $\frac{3}{4}$ lb. oil-cake each. They are kept out every good day up to the middle of October, and after that they get a run out for a few hours every good day. In this way they are changed by degrees from the field-keep to the winter-feeding, which consists of plenty of yellow turnips in the morning, oat and barley chaff soaked in water sweetened with treacle in the afternoon, and at night about 1 lb. of oil-cake each, with oat-straw and water in the fold beside them.

One-year-olds on Pastures.—In spring the one-year-olds go out every fine day. They thus get a taste of the first come grass, and as the grass increases the inside feeding is reduced. In this way they are taken from the winter to the summer keep by degrees. No artificial stuffs on the pastures are given to one-year-olds.

Fattening.—They come in about the end of September, earlier if possible. The fattening of the heifers is begun at once, but forcing of the bullocks is deferred till after the New Year. At twenty to twenty-four months the weights come to be 5 to 6 cwt., and the prices from £15 to £18. Mr Shearer sometimes, however, keeps on a few to be fed on the grass. These get only turnips and straw in the winter. In spring a little cake is given to them in the fold. When they go to grass the cake is increased, and bruised oats or meals added. By the middle of June they are up to about 3 lb. of oil-cake a-day and 4 to 5 lb. of meals or bruised oats. In July or August they are fit for the butcher, and weigh at, from twenty-six to thirty months, 6 to 7 cwt., bringing £19 to £23.

The best Crosses.—Mr Shearer, a Moray man, who was in early life a gold-miner in Australia, has a business faculty for

forming his plans and carrying them out with exactitude. He gives his experience of the best crosses: 1. Polled cows with shorthorn sire. 2. Cross-horned cows with Aberdeen-Angus sire. 3. Highland cows with shorthorn sire. And of the worst: Highland cows with Aberdeen-Angus sire; or worse still, any sort of cows with cross sire.

Mr John Rose, Leanach.

Leanach is a farm of 530 acres arable, no natural pasture. One-half is poor thin soil, the other light friable—all on mountain clay. It has a southerly exposure, and is 450 to 500 feet above sea-level. Rotation is six shifts, with three-years' grass. The greater proportion of the grass and about half the turnips are consumed by sheep. Three-fourths of the grain crop are oats, one-fourth barley. In winter the cattle number about one hundred. Twelve are cows, some polled, some crosses. The sire is shorthorn.

Rearing.—About sixteen calves are reared, some of them being bought at auction sales, probably at about £3 each. The whole of the calves are suckled; and they are weaned about 12th August and fed on grass and cake. The housing of them for the winter depends on the grass and the weather. Generally it is about the middle of September, when the inside feeding is first tares and cake. The winter ration is principally turnips and straw, with cake. About 3 lb. of cake are given to each occasionally when found necessary. Artificial stuffs are discontinued for a short time before the one-year-olds go out to grass, and they get none of them on the pastures.

Six-quarter-olds.—The time of taking in the cattle in autumn varies much with the character of the weather and the fulness and freshness of the grass. Fattening begins about a month after tying up.

Bought-in Cattle.—Some forty or fifty cattle are purchased at various times throughout the season at auction sales, crosses and polls, all home-bred, partly one-year-olds, partly two-year-olds, prices £9 to £11, 10s. There is no house-feeding in summer, nor any artificial stuffs given on the pastures. In the autumn the cattle get tares, with, in some cases, a few early turnips.

The regular winter ration begins about the middle of October, in stalls. It is as many turnips as can be consumed; but each animal is considered separately, and treated according to its needs and capacities. When turnips are not plentiful they are supplemented by draff.

Fattening.—Fattening begins about a month after the cattle are tied up. Three feeds of turnips are given daily, with 4 lb

of cake and bruised oats at 8 P.M. Three weeks after being put in to fatten the cattle are washed with Macdougall's dip, and are groomed daily with comb and brush. No change of feeding is made near the finish. Sales are at auction-marts, six-quarter-olds bringing £16 to £18, 10s., and two-year-olds £20 to £22.

Mr James Reid, Castle-Stuart, Petty.

A low-country farm this is, less than a mile from the margin of the Moray Firth. It is chiefly light in soil, and about two-thirds of the grass and turnips are consumed by cattle. Mr Reid is wholly a feeder. He keeps as many cows only as supply the house and servants with milk, the calves being sold when newly dropped.

How the Stock is made up.—In the spring Mr Reid buys home-bred cattle from two to three years old to feed off on the grass. He begins to buy Canadian cattle in October, and goes on picking them up till the middle of November. In all last autumn he had seventy-seven of them that cost £10 to £14.

Fattening.—Of these, thirty were stalled at once for fattening, and got first in the morning 3 lb. each of oil-cake, afterwards turnips and oat-straw, turnips and straw again at mid-day, a mixture of ground oats, barley, maize, and bran sweetened with treacle in the afternoon. The forty-seven Canadians in the folds meanwhile got turnips twice a-day, with oat and barley straw. The greater part of those first tied up were fat, and sold by the New Year, and as they were disposed of others were taken in from the folds to fill their places.

This goes on all the winter until all the seventy-seven are fattened and go to the butcher. They generally pay for their keep from 20s. to 40s. a-month.

Mr William Mackenzie, Moyhall.

Moyhall is a good specimen of a farm amongst the hills, 900 feet above sea-level. It extends to 240 acres arable and 500 acres of hill-pasture. The arable soil is black loam on moss and gravel. The rotation is six shifts, with three-years' grass. Eighty cattle get all the turnips and sown grass with oat-straw. No barley is grown. The cows number forty-five, and are Aberdeen-Angus, West Highland, and cross, the sires Aberdeen-Angus and West Highland.

Calves.—Forty calves are reared. The pure-bred ones are suckled by their dams, one to each; the crosses are fed from the pail. The pure calves are weaned when about six months old and fed on linseed-cake, bran, turnips, and straw. The pail-

calves have their milk in three weeks gradually increased to full allowance of 2 gallons each per day. No skimmed milk is used. As the calves get older their warm milk has added to it some linseed-meal, which, after being mixed with boiling water, is stirred into the milk.

Calves in Autumn and Winter.—When weaned at about six months old, these cross calves that have been fed from the pail are turned into the turnip-field. At first they do not touch the bulbs. They eat the tops, but many people believe this does not impede the growth of the plant. So soon as they begin to bite the bulbs the calves are taken out of the field and housed, and fed on turnips, cake, and straw. The winter ration of all the calves begins about 1st October. It is cake, turnips, straw, and bran. They get 3 lb. cake each in the morning, and the same in the evening, with a mash at mid-day. This is continued up to the grass.

Summer Keep.—No artificial stuffs are given on the pastures except to animals for showing. No house-feeding in summer is practised, and no fattening is attempted. All are sold as yearlings, pure-bred polled bulls averaging £20.

Mr John Cran, Kirkton.

Let us cross the Ness to the north side of the Highland capital, taking a look at Mr John Cran's farms of Kirkton and Phopachy, on the side of the Beaully Firth. Here the breeding of pedigreed cattle is carried on extensively. These two farms adjoin and form one holding, rising from the sea-margin to 500 feet; extent 420 acres arable, chiefly light, soft, loamy soil on gravel and mountain clay. The best land is worked in five shifts, while the high-lying and lighter fields are left in grass for a considerable time. About four-fifths of the grass and turnips fall to the cattle, which number about 100 in summer, 160 in winter. About half of the straw is from oats. Of thirty cows twenty-five are pure Aberdeen-Angus, and the balance crosses or Ayrshires for dairy purposes. Sires, Aberdeen-Angus.

Rearing of pedigree Calves.—About twenty-five calves are reared, each suckled by its own dam. They are weaned at six months and fed on sliced yellow turnips and straw, with a little linseed-cake. Their winter ration is sliced yellow turnips, straw, and cake. It is continued to the grass, but no artificial stuffs are given on the pastures. These pedigreed youngsters are not fed, but are either retained to keep up the herd or sold to breeders at various ages, and at prices varying very much, according to pedigree and form.

Bought-in Cattle and their Fattening.—Mr Cran buys in

annually about two hundred cattle for fattening, some of them home crosses, but for the past five years five-sixths of them have been Canadians. These are purchased chiefly from August to November. They are mainly house-fed; but sometimes fattening is begun on the pastures, from 2 to 4 lb. of cotton-cake and meal being given daily in the fields, according to the size and condition of the animals. About the middle of September all of them are housed, some going into stalls, some into folds, the results in both cases being about similar.

The winter ration is from 100 to 112 lb. of turnips to each daily, with straw *ad libitum*, and linseed- and cotton-cake and feeding meals. The feeds are at 6 A.M., noon, and 5 P.M. The cattle are washed after being first housed, and at other times when it is considered necessary; and they are groomed every day after the morning feed. Some additional cake and meals are given as fattening draws to a finish, and sales take place at home as well as at auction sales, chiefly at sales.

Mr Cran's experience is that Canadians pay best for the food they consume in being fattened.

Mr George Reid, Bruiach.

Bruiach is in the same district as Kirkton, and extends to 204 acres arable, with about 10 of pasture. It is black loam on gravel, 100 to 200 feet above sea-level, and mostly level. The five-shift rotation has been practised, but a six-shift course is being adopted in consequence of finger- and -toe in turnips. All the turnips, and five-sixths of the grass, are consumed by fifty to sixty head of cattle, fully half of the straw being from oats. Ten cross cows with Aberdeen-Angus sire are kept.

Calves.—Besides the ten calves produced on the farm, twelve to fourteen are bought in at 30s. to 60s. to suckle, and £4 to £6 when weaned. Generally four cows suckle three calves each, first two and then one. These suckled calves are weaned at sixteen weeks old, and get 1 lb. each of linseed-cake daily in addition to grass. The calves milked from the pail are in six weeks brought up to their full allowance, which is 15 pints per day newly from the cow. Mr Reid does not believe in skimmed milk. Weaning takes place at eighteen to twenty weeks, and the feed is then linseed-cake and grass. The calves are put into the folds at night about the second week of September, and get tares for supper for about six weeks, with a few turnips.

Calves in the Winter and Spring.—The winter ration is straw and turnips. If turnips get scarce in spring, the calves, now one-year-olds, get each 1½ lb. bruised corn up to the grass.

Fattening.—Sometimes a few one-year-olds, intended to be

sold in July, get 3 lb. cake per head per day on the grass. House-feeding in summer is not often practised. The six-quarter-olds are housed about the middle of September, and generally all sold fat before March. Bullocks weigh from $5\frac{1}{2}$ to 7 cwt., and bring £16, 10s. to £22, 10s.; heifers weigh $4\frac{1}{2}$ to $6\frac{1}{2}$ cwt., and bring £14 to £20. Mr Reid adds: "The suckled calves are put to the cows three times a-day. They get, in spring, some cut turnips and a little cake. When the first pair are weaned at sixteen weeks, a fresh young one is put to the cow in the same way as the first two. A good cow will bring up three calves very well. We do not allow the calves to go with the cows."

Mr William MacBean, Cradlehall.

Cradlehall is a farm of 260 acres arable, with 30 acres of rough pasture. Part of the farm is level, about 70 feet above the sea, the rest of it rising with a northern exposure to 150 feet. Sheep consume about a third of the turnips. Of sixty to seventy cattle, twenty to twenty-two are cross cows, the sires being both Aberdeen-Angus and shorthorn.

Calves.—From thirty-five to forty-two calves are reared, about a half of them being bought from crofters and farmers who sell milk. The prices were 25s. to 60s. until last year, when they came down to from 20s. to 40s. Half the cows or thereby suckle calves, the others are milked and the calves fed from the pail. The suckled calves are put to the cows three times a-day.

The pail-calves are in about two weeks up to their full allowance of milk, which is about 3 to 4 pints, unskimmed, at each of their three meals. It is mixed, after the calves are three weeks old, with linseed gruel. Weaning alike of the suckled and pail-calves takes place at from four to six months, and the feeding then is cake and tares, or cake and cut grass.

Calves in Winter.—About the 1st of October the winter-feeding begins. It is turnips, oat-straw, and draff, with meals and cake. The draff is generally mixed with oat and barley chaff, and with the meals and the cake, this being the last feed at night. This winter ration is continued unchanged up to the grass.

Summer Methods.—Cake, draff, and bran are always given to the one-year-olds on the pastures. Housing at night is generally continued for the first month or six weeks after the one-year-olds go to the grass; then about the middle of August they are taken in and are fed on tares, draff, bran, and meal.

Selling One-year-olds versus Fattening Two-year-olds.—Mr MacBean says: "I have not fattened many cattle for the past ten years. I found that selling them as one-year-olds in April,

May, or June, paid better than keeping them till they were two years old. In 1882 I got from £16 to £20 for my two-year-olds. Before that, for say three years or so, I got from £18 to £25, and before that date I got up to £28. In 1883 I sold twenty-four one-year-olds at £16, 10s., and the following year I did the same. Since then prices have not been so high. I have been getting £9 to £13 for the past two years, some of them going to £14, 10s." Two-year-olds, when fattened, run from 5 to 7 cwt., and sell at from £15 to £21.

Management of Cows.—Mr MacBean does not keep his cows beyond six years old. He makes up his number every year by six or eight of his best heifers, which have calves at two years old. By parting with his cows early, he gets good prices for them—from £18 to £24—when they are coming near calving. He generally gives cake to his cows when milking.

Two-year-old cows under milk he finds must have cake to keep them up in condition. He milks them all the first year. The suckled calves he finds the best; and those bred on the farm generally turn out better than those bought in.

Mr William Kelman, Wester Lovat.

Mr Kelman was one of the few who got the top price of the last Smithfield Christmas market for the fat bullocks he sent to it—5s. 4d. per 8 lb. And he has often in past years been in the same fortunate position, or near it. His 300 acres, arable, of rich alluvial soil, he works in five shifts, and gives the winter foggage and 10 or 12 acres of turnips to sheep.

The Stock of Cattle.—His cattle number sixty to eighty, the only cows being as many crosses and Ayrshires as will keep the house and servants in milk. All the cattle are bought, about half of them locally—home-bred black polled crosses, for most part rising two years old, at from £14 to £17. The others are Canadians, purchased in the autumn at from £12 to £15.

Fattening.—Feeding begins on the pastures, but scarcely any artificial stuffs are given on the grass. The autumn ration is good clover hay, or tares, with a little oil-cake.

The winter ration, begun early in November, or in the end of October, is nearly as many turnips as the cattle can consume, with straw and artificial stuffs. When turnips are scarce, from 50 to 70 lb. per day is the allowance, with cake and corn, and at times some treacle with chaff. The feeds, under usual circumstances, are a little cake and corn about 5.30 A.M., then turnips and straw; a few turnips again about 10 A.M., turnips about 4 P.M., with fresh straw, and later on, cake and corn.

The cattle are washed when housed with Little's dip diluted with water, and groomed daily from 9 to 10 A.M.

As fattening gets near to a finish, fewer turnips and more artificial stuffs are given, with sometimes a little hay. Sales are mostly at auction-marts, and in the London markets. Canadians, if moderately bought, Mr Kelman thinks, pay as well as any.

Mr Rattray, Easter Lovat, Phoineas, and Struy Mains.

Mr Rattray on these farms of 530 acres arable and 700 of pasture has a pedigreed Aberdeen-Angus stock, and some cross-bred cattle bought in for fattening. The pure-bred herd has about forty-five cows.

Rearing.—The calves are suckled for seven to eight months, and when weaned in September or October they are put on foggage and cake, or turnips and cake, their winter keep being swedes, cake, hay, and straw. At first the cake given is about 1 lb. to each in the morning, and 1 lb. in the evening. It is increased to about 3 lb. twice a-day, with a little bran if turnips are scarce. Artificial stuffs are continued in small quantities up to the grass, and about 1 lb. each per day is given on the pastures for the first month.

Fattening.—Mr Rattray does a good deal in fattening. Six-quarter-olds are put in folds about the end of October on turnips and straw, and turned out to grass next summer. Then they are housed in August and fattened on bruised oats and barley, with cake and hay or straw, when rising three years old.

For the cattle bought in for fattening the prices paid are £12 to £15; and they generally leave about 30s. a-head per month for keep when they are liberally fed with bruised oats and barley with cake.

Lord Lovat.

Lord Lovat's home farm of Beaufort has a shorthorn herd. The farm extends to 500 acres of light loam on gravel, some 80 feet above sea-level. It is worked in seven shifts—viz., four-years' grass (one of them hay), two grain crops, and one green crop. Of 120 cattle sixty are cows.

Rearing.—About forty calves are reared annually. The calves of the cows used for dairy purposes are sold young. At six to eight months the suckled calves, all pedigreed, and one to each cow, are weaned. They are taken from their dams and put into folds, while the cows go to grass. The calves are allowed to the cows twice a-day for the first week, and once only for the second week, when they are taken off entirely if the udders of the cows are safely dried up. The feed of the calves at weaning is hay with what turnips they can eat, and

1 lb. each per day of linseed-cake. The cake is increased by about February or March to from 2 to 2½ lb., and is supplemented after this period by 2 lb. of ground grain made into a mash the day before it is used.

If the calves are to be sold in February or March, this feeding is continued up to that time. If they are to be kept for breeding and going to grass, the cake is taken off about the same date, or when the weather gets warm. No artificial stuffs are given on the pastures. Females are housed in October, and reduced as much as possible to prepare them for breeding. They are apt to get too fat on the grass.

The young animals are sold generally at about one year old, and bring from £20 to £60.

Mr A. Birnie, Wellhouse.

Mr Birnie works wonders in turning out stock from his 130 acres arable. But his soil is good—heavy loam with clay on sand. And, in the valley of the Beauly, he is only 20 to 50 feet above sea-level. Two-thirds of his farm he works in four shifts; on the other third, which is lighter, he has six shifts, including three-years' grass. A third of the turnips, the whole aftermath, and winter grazing go to sheep. Two-thirds of the crop are oats, the other third barley. The cattle stock are six to eight cows, and the same number of calves or stirks in summer, with thirty to forty feeders purchased for the winter. The cows are crosses and shorthorns.

Rearing.—The few calves reared are suckled, generally two to each cow, except in the case of shorthorn bull-calves, which get all their mothers' milk. Mr Birnie last year in November bought twenty-four weaned calves, mostly home polled crosses, at an average of £5. His own calves are weaned at six months, getting each ½ lb. linseed-cake, increasing to 2 lb. through the winter in the case of bull- and ox-calves. Heifer-calves intended for cows get no artificial food. All are housed for the night in September, and altogether in October, their winter feeding consisting of turnips and oat-straw with access to water, and the artificial stuffs already mentioned. They are sold at one year old, except those kept for cows.

Bought-in Cattle.—The feeders bought for the winter have for some years past been Canadians, but last autumn home-bred stock being very much cheaper than formerly, they were purchased instead. The Canadians came chiefly from Glasgow in September, three or four years old, at £11 to £15. They were two or three weeks on the grass before being housed, getting no artificial stuffs. In the first week of October they were put in, most of them into covered folds, the others into stalls. Stalls are

preferred, especially for horned cattle over two years old, when they get a good bed and have their skins attended to.

Fattening Ration and Method.—The winter ration is about 80 lb. of turnips each per day at twice, with straw and artificial stuffs. The feeds are 2 lb. cake at 6 A.M., turnips by 7 A.M., turnips again at 3 P.M. with plenty of fresh oat-straw in racks, at 8 P.M. 2 lb. hashed grain previously mixed with water and treacle.

The cattle are washed with Macdougall's dip when put in to fatten, and a few days later with carbolic soap and cold water. And they are washed at least once a-month with soap-and-water until fattened. They are groomed daily about noon.

The artificial foods are increased by degrees until the cake and corn come to be about doubled by the time the cattle are finished. Sales take place from December till February, partly at auction-marts, partly at home. Mr Birnie thinks Canadians have paid best.

ROSS-SHIRE.

Ross is much more a feeding than a breeding county. Most of the larger farmers buy the greater part of their cattle, keeping only a few cows to supply the milk required for the family and the employees.

Mr D. Cameron, Fettes.

Some are turning to breeding, however. Mr Cameron, Fettes, writes, "I do not feed cattle now." His 350 acres of loam on freestone, about 220 feet above sea-level, are worked in six shifts, with three-years' grass. About half the grass and a third of the turnips are consumed by sheep. The remainder falls to the cattle, about half of the straw being from oats. Of some seventy cattle, exclusive of young calves, one-half are cows, mostly shorthorns, and the sires are shorthorns.

Rearing.—Thirty calves or thereby are reared, all bred on the farm and suckled. They are weaned at eight or nine months, and fed on turnips and straw, and a little hay and cake. Usually in September they are put on their winter ration—turnips, straw, hay, cake, and meal. The cake and bruised oats, barley, and bran are given alone, morning and evening. This feeding is continued up to the grass, but no artificial stuffs are given on the pastures. The bull-calves are sold when about twelve months old, and the cow-calves not required to replace discarded cows are sold as opportunity offers. They are all shorthorns.

Mr Æneas Adam, Humberston.

Humberston and Blackwells, in the neighbourhood of Dingwall, extend to 390 acres. The one looks to the south and the other to the north. Their fields, many of them steep, rise from 30 to 430 feet above sea-level, the lower-lying ones having a good depth of loam with a fair mixture of clay. The six-shift rotation is followed, including three-years' grass. Of seventy to eighty cattle in winter, and 120 to 130 in summer, some twelve are cows, crosses, and the sire is shorthorn.

Rearing.—About twenty calves are reared, eight of them or thereby being bought at market or sale at 40s. to 60s. All the calves are suckled, and at weaning, about four months old, they are put off to a different farm from the one their dams are on, getting tares, foggage, and oil-cake. Before the foggage and the tares are done they get some turnips, in order to make as easy as possible the shift on to the winter ration, which is straw, turnips, bran, and oil-cake, the bran and oil-cake being given between feeds of turnips.

This feeding is continued up to the grass, and the oil-cake and bran are continued throughout the summer. Housing takes place at the beginning of October, and the fattening of the stronger ones begins at once. They are finished at about two years old, and weigh about 6 cwt., which at 60s. would give £18.

Summer Fattening.—Mr Adam makes up his numbers by purchasing one- and two-year-olds, generally home-bred. Fattening begins in summer, partly on the pastures, partly in folds. In boxes on the fields the cattle get a mixture of cake and bran, about 2 lb. to each. The autumn feeding is the pastures, with cake and bran. Housing takes place in the beginning of October, those further advanced in condition being put into stalls, the others into folds. Those in the folds afterwards take the places of the stalled ones that are first finished and sold.

Winter Fattening.—The winter feeding is a good barrowful of turnips between every two at 5 A.M., and again at 1 P.M., with straw, cake, and bran. Yellow turnips are given first, afterwards swedes.

The cattle are not washed, but they are groomed now and again, not regularly. They are sold as they get finished. Mr Adam thinks home cattle are as profitable as any when they can be bought at the low prices now current.

Mr Walter Arres, Fodderty.

Fodderty is in the beautiful and fertile Strathpeffer valley, a farm of 426 acres arable and 94 of pasture. The low land is

about 30 feet above sea-level, the higher going up to 300 feet. The five-shift rotation is adopted. About half the grass and turnips goes to sheep, the other half to cattle, one-half of the straw being from oats. Of one hundred cattle or thereby, eleven are cows.

Calves.—Twelve calves are reared, some of them being bought round about the farm, generally at 60s. All are fed from the pail, and at twelve to fourteen days are up to their full allowance of milk—nearly $1\frac{1}{2}$ gallon a-day. Whole milk newly milked all the time it is. After the calves are pretty well on to the milk, it is mixed for them with linseed-cake meal. A handful is mixed with the milk for a time, and then it is given dry. At four months weaning takes place, and then the youngsters get 1 lb. each of cake per day, along with the best grass that can be obtained for them.

Winter and Summer Keep.—At the 1st of October the calves are put on winter-feeding—nearly full turnips and oat-straw, with 1 lb. linseed-cake. This is continued up to the grass; but once out to the fields, they feed on the pastures only. Very seldom is house-feeding in summer tried. The six-quarter-olds come in at the beginning of October, and fattening of them begins at once, slowly at first, but afterwards going on more rapidly.

Bought-in Cattle.—About fifty crosses, polls, and English cattle are purchased every year. No house-feeding in summer is practised, and no artificial food is given on the pastures. Housing takes place about 1st October, partly into stalls, partly into folds; but Mr Arres thinks stalls are best.

Fattening in Winter.—The winter ration is 80 to 100 lb. of turnips to each per day, with 4 to 6 lb. of grain meals, and after a bit 3 lb. of cake in addition. The turnips are given at twice, 6 A.M. and 1 P.M.; meals at 4 P.M. to begin with; afterwards, as fattening goes on, meals and cake at 10 A.M., as well as the meals at 4 P.M.

The cattle are partially groomed every afternoon. Spring is the time for selling. The animals are nearly all home-bred. They pay best for fattening, Mr Arres finds.

Mr G. Smith, Kinkell Castle.

Mr Smith works his 140 acres of black loam, on gravel, in five shifts, and gives about one-sixth of his turnips to sheep.

Stock of Cattle.—Some forty-five cattle are kept, six of them cows, crosses, with shorthorn sire. Their calves are reared for fattening, and at one time and another during the year some sixty home-bred cattle are bought, chiefly at sales in Inverness and Dingwall. About half of them are crosses, the other half

polled. They are one-year-olds in spring, at £9 to £10, or six-quarter-olds in August, at £12 to £13.

Summer Fattening.—House-feeding in summer is practised generally, the ration being cut grass, with 3 lb. cake and 3 lb. meals, to each per day. When the houses are filled, the rest of the cattle go to the pastures; and if grass becomes scarce, they get about 2 lb. each of oil-cake and meals—such as oats and Indian-corn meal in troughs at night. The autumn feed is tares, with cake and meals.

Winter Fattening.—The winter ration begins about 20th September—as many turnips as the cattle can consume, with artificial stuffs. The turnips are given four times a-day, at 6 and 10 A.M., and 1 and 4 P.M.—a basketful to each every time, if the beast will eat them. The artificial foods are increased as fattening proceeds, and then the animals eat fewer turnips.

Stalls Mr Smith thinks best, as the cattle get most peace and most justice of the cake and meals. The animals are washed with Macdougall's dip after being housed for ten days, and this is repeated in three weeks. They are groomed daily from 8 to 10 A.M. At sales and at home they are sold as they are finished. Mr Smith finds home beasts eat less, and give the best prices when selling.

Mr John Hall, Tomich, Broomhill, and Pitmadruthy.

These farms, near Invergordon, extend to 740 acres arable and 20 acres of wood pasture. Mr Hall does not do much in the rearing of calves. About 90 acres of grass and 45 of turnips are given to sheep. Of his two hundred cattle only ten are cows, shorthorn crosses, with shorthorn and Aberdeen-Angus sires.

Rearing.—Calves are fed from the pail, weaned at four months, are never out over-night, and get at weaning a small quantity of cake, with grass or tares at night. The winter feed begins about 1st November—turnips and oat-straw, with 1 lb. cake during the winter months, and 2 lb. in spring. When the turnips and small potatoes are finished in early summer, the one-year-olds get cut grass in the folds. If they go to the pastures they get no artificial food there. They are housed for the winter in September on turnips and oat-straw.

Fattening.—Fattening begins about Christmas, after the 2½-year-old cattle, fattened by that time, are away. Those ready for the butcher at two years old weigh about 6 cwt., and bring about £18.

Bought-in Cattle and their Fattening.—The greater part of Mr Hall's work in cattle is in fattening those bought in. From 130 to 140 are fattened every year. They are mostly purchased

at two years old for £14 to £15, and sold at Christmas, when finished, at about £20; some of his own rearing, which are kept on to two and a half years, reaching over 7 cwt., and bringing £22 to £23.

His two-year-olds are fed on grass in the fields up till August; in courts afterwards, with cut grass or tares, and 3 lb. of cake. When grass and tares are done, turnips take their place, about 1 cwt. to each beast per day at two feeds, one at 6 A.M., the other at noon, with linseed cake and corn mixed in the proportion of two-thirds cake to one-third of corn.

These older animals are all to be turned out finished by Christmas, and for the last month have the cake and corn increased to about 10 lb. per day, given morning and evening. In addition to good oat-straw they get a handful of hay in the forenoon from the first of their house-fattening, and for the last month they get a similar feed of hay at 8 P.M.

Mr John Gordon, Balmuchy and Cullisse.

Balmuchy is a farm of 450 acres in the centre of Easter Ross. The soil is light, the subsoil partly mountain clay, partly red sandstone. The farm is almost level, and 20 to 40 feet above the sea. The rotation is two years grass, then oats, potatoes, wheat, turnips, barley. The grass and turnips are consumed, one-half by sheep, one-half by cattle, and the straw comes in equal proportions from wheat, barley, and oats. Of eighty to one hundred cattle, twelve are cross cows, the sire a pure-bred shorthorn.

Rearing.—The calves, about twelve in number, are suckled, generally two to each cow, and their subsequent history is very simple. When milk gets scarce for the work-people in harvest or autumn, they are weaned and “fed on turnips, hay, grass, tares, and cake, which are continued till they go to the butcher.” They get their grass in the house, and are always sold under twenty-four months old, realising on an average about 20s. a-month.

Mr Gordon fattens wholly on Cullisse, which is a farm of 500 acres of alluvial soil of clayey tendency, generally level, and only 10 to 20 feet above the sea. It is worked in five shifts, and half the grass and turnips is given to sheep. Cattle number over one hundred, only six cows being kept to give milk for the work-people. The whole of the fattening cattle are bought, mostly home-bred beasts, crosses, and polled, with some Canadians. They come in at all ages, from six quarters old up to four years.

Fattening.—When the pastures get short the animals, as Mr Gordon tersely puts it, “are caked.” Cotton-cake is used largely

at first, in the proportion of three-fourths to one-fourth of linseed-cake. The autumn feed is grass and tares. The winter ration begins at 1st October, partly in stalls, partly in folds. Mr Gordon finds that a 6 to 7 cwt. bullock feeds best if tied up. The winter-feeding is turnips with cotton-cake and linseed-cake to begin with, the cotton-cake being gradually discontinued and replaced with bruised oats. Further, the oats are increased to firm the flesh as the fattening gets nearly finished. The quantity of turnips is regulated according to the state of the animals' stomachs. Two feeds of them a-day are given after cake, or cake and corn.

While eating their turnips the cattle are groomed, cleaned, and bedded, every care being taken to keep their skins right.

Mr Gordon sends large lots of his cattle to the London Christmas market every year; and with the returns from last one, dull as it was, he was quite satisfied.

Mr John Ross, Meikle Tarrel, Fearn.

Mr Ross's system is unique. Of him it may be said more than of most people, that he fattens from the births of the animals until they are ready for the butcher, before they are two years old. He seldom has a two-year-old on his farm, and yet all go direct to the block. He occupies 600 acres arable and 40 of pasture. The arable land is black loam on clay, and the elevation is 70 to 190 feet. Half of the farm has been laid down to permanent pasture, the other half is worked in six shifts, the good land in two years' grass, two corn crops, turnips, corn. The secondary land is left three years in grass, with only one corn crop after. Half of the grass and one-third of the turnips are consumed by sheep. Two-thirds of the straw is from oats.

The cattle vary from 100 to 150, and of these forty to forty-five are cows, carefully crossed. Sires some years ago were Aberdeen-Angus, more recently they have been shorthorns.

Calves.—Some fifty calves are reared annually, the few purchased ones costing 35s. to 70s. They are all suckled—two generally to each cow,—and they are weaned two or three months before the dams calve again. When taken off the milk, they are always strong enough to take a share of what food on the farm may be in season, and it is supplemented by 1 to 2 lb. linseed-cake or $\frac{1}{2}$ lb. of linseed ground and boiled along with $\frac{1}{2}$ lb. bran and 1 lb. meal, all mixed with cut straw. With food of this kind, chiefly boiled, the change from the pastures or autumn inside feeding to turnips is easily accomplished.

Winter Feeding of Calves.—The winter ration is $\frac{1}{2}$ lb. linseed, $\frac{1}{2}$ lb. bran, 1 lb. cotton-cake, and 1 lb. meal made of the cheapest

material in the market, but for most part of the produce of the farm. All these are boiled and mixed with cut straw, sufficient to make two good quickly eaten-up diets per day. The turnips, 30 lb. a-day to each animal, are cut in finger pieces, and given at two feeds.

This ration is continued up to the grass; and if hay is cheap, a small quantity of it, dry and cut, is given in addition as the season advances.

One-year-olds in Summer.—The one-year-olds are seldom put out to grass, but if they are, it is mainly on the natural pastures, and no artificial stuffs are given on them. In house-feeding, the artificial mixtures of the winter are continued. The sown grass is all used for summer house-feeding, or made into hay.

Close of the Fattening.—As the season advances down into the autumn, the mixture of artificial foods already described gets added to it 1 lb. of meal and 1 lb. of cotton-cake; and hay, when cheap, is substituted for straw. The animals not house-fed in summer—heifers in calf chiefly—are housed when cold weather comes, but get a daily run to the pastures until the beginning or middle of November, according to the season and the state of the fields.

The fattening animals are generally finished before the New Year, weighing alive about 12 cwt., and nice in quality, making about 40s. per live-weight cwt.

Contemplated Changes.—Mr Ross writes: "Owing to the smaller cost of summer and winter keep, I purpose giving each cow only her own calf to suckle in future. The cow will do almost with the natural produce of the farm, and so will the calf till autumn. And the calf will be far superior to those suckled with two to each cow. Then there will be saved the very high prices paid for good calves in the spring months, and the danger of getting bad calves. If dairying could be combined, all this would be changed; but in present circumstances and at present prices there must be as little high pressure as possible, only using all produced on the farm to the very best advantage. This can best be done, I believe, by breeding and feeding the best class of cattle and sheep that the farmer can produce, and buying the best he can lay his hands on. Accommodation for housing cattle comfortably, and preparing food conveniently and economically, is absolutely necessary."

Needless to say, a system like Mr Ross's requires the closest personal attention, and from him it receives this.

Mr Jonathan Middleton, Clay of Allan.

Clay of Allan is another large Easter Ross farm. It extends to 580 acres of clay loam on sand, all arable and flat, not over 4

to 6 feet above sea-level, some of the leader drains being flushed by every high tide. It is worked in five shifts, cattle getting one-fourth of the grass and two-thirds of the turnips, while the straw is chiefly from oats and wheat, which each double in extent the area sown in barley. Fattening is the sole cattle industry. Four or five cows are kept for milk only, their calves being sold.

Stock of Cattle.—Cattle number 60 to 80 in summer, and from 150 to 170 in winter. Altogether from 280 to 300 are bought during the year. Those for autumn fattening are purchased in the neighbourhood and at Inverness sales. Home-bred crosses they are, a small proportion polled. All are two years old. The cattle bought for winter and spring fattening are chiefly fleshy Canadians, costing £14 to £15, 10s. in Glasgow. Sometimes English cattle come into the purchases.

Summer Feeding.—Summer feeding is chiefly in the house. Partly it is on the pastures, but on them artificial food is not given as a rule, only when grass gets abnormally short. Then it is supplemented by cake, one-half cotton-cake the other half linseed-cake. It is given in small boxes on the field—3 to 4 lb. in all to each. That quantity is always given in the house, when the cattle are taken in in autumn. They are housed about 1st August, one reason being that taking them in so early relieves the fields for lambs.

Management of Grass.—Mr Middleton's plan is to eat a part of his young grass very bare up to 10th June, with feeding sheep, which consume a full allowance of cake on it. Then he top-dresses it with 3 cwt. superphosphate and 1½ cwt. nitrate of soda. That makes a nice cut from it in August and part of September for the housed feeders. After this is used up, a few tares and turnips are given up to the time for full winter allowance of turnips.

Winter Fattening.—The regular winter fattening begins late in September or early in October, in stalls, single loose-boxes, and folds. Mr Middleton would prefer single boxes if they were not extravagant in taking up room and bedding. He likes folds least, but considers them necessary to get the manure from the stables and the byres tramped.

Fattening Ration.—The turnips in fattening never exceed 100 lb. a-day, with oat-straw *ad libitum*, sometimes hay for the last two or three weeks. The artificial stuffs begin with 3 to 4 lb. of the mixed cake, increasing to 8 lb., 3 lb. of which, however, are meals of some kind brought into the mixture as fattening advances. The feeds are turnips twice, and the cake and meal mixture twice daily.

All the tied-up cattle are groomed daily, those in loose-boxes every four or five days, those in folds seldom. They are all

washed with sheep-dip when put in to fatten, a few days after with soft-soap, and, as a rule, not again unless for some special reason.

The sales are at auction-marts in Inverness and Edinburgh, and in the Smithfield Market, a few being disposed of at home to local butchers. Mr Middleton finds home-bred and Canadian cattle pay best.

Mr J. G. Macgregor, Fearn.

Fearn, in the same district, is a farm of 680 acres of strong black loam or bank-land and very strong clay, with 42 acres of heather and rough grass. It is very little above sea-level. Part is worked in five shifts, part in six, and the turnips and grass are consumed half by sheep, half by cattle. Of 170 to 200 cattle, hitherto only twelve have been cows, but they are being increased to thirty. They are shorthorn and cross-pollled, the sire being Aberdeen-Angus.

Rearing Calves.—Mr Macgregor writes: "The calves are suckled, running with their dams till September; but from experience I had two years ago I consider two months' milk quite sufficient for a well-bred calf. I had a pure shorthorn cow then suckling two calves. She went wrong in the udder, and the calves had to be weaned. This was in the end of February. To experiment against milk they got cut turnips and cake and meal *ad libitum* until grass came, when they were both turned out to the pastures with the cattle to be fed for Christmas. In September I took the best one in for feeding for showing, and in fourteen months thereafter he scaled 9 cwt. beef."

Weaning and Winter Feeding.—The calves are usually weaned at from four to six months old, getting grass or turnips, with a little meal and cake. Gradually they are turned on to their winter feeding, which is turnips with 1 lb. of linseed-cake till end of February, given as the first feed in the morning.

Later History.—The pastures only are the food of the following summer. At six quarters old the cattle are taken in from August to September, and get turnips and straw for the autumn and winter. They are not fattened at two years old. Next summer they are put on good grass, care being taken not to allow them to "shake" between the turnips and the pastures. In the autumn they are fattened and come to weigh 7 to 9 cwt. Some are fed off at twenty months, but they never go out to pastures. They are house-fed, getting in the summer cut grass and cake.

Change of System favoured.—Mr Macgregor says: "I think where land is of medium quality a farmer should grow all his

own cattle, and even on the largest and best holdings part of the cattle should be reared. If this system were adopted, the breeder and feeder would find the cattle industry more remunerative than it is at present."

Bought-in Cattle.—About 150 cattle are bought annually. Mostly home-bred they are, but generally a third and sometimes a half Canadians. Many of the home animals come from Banff and Morayshires, crosses being found in Ross-shire itself. They are all cross-pollled or cross shorthorns about two years old, and ranging in price from £14 to £17. The Canadians are selected as young as possible, and cost £10 to £16.

Fattening.—Artificial stuffs are never given except in the house. The house-feeding in summer and autumn is chiefly on cut grass. The winter ration begins about 1st October. Stalls are preferred. Only polled cattle are fattened in folds. Each bullock gets 140 lb. of turnips per day in three feeds—at 6 A.M., 10 A.M., and 4 P.M.,—with cake and meals, the meals being increased a little and some hay given as the finish is nearly reached. The young cattle bred and reared on the farm come in with the bought feeders at two years old and reach 7 to 9 cwt. by selling time, which begins in November and ends in April.

Best Cattle to feed.—Mr Macgregor says: "As a rule, I find cross-polls pay best. Next to them come Canadians. I have no experience of Irish cattle."

Attention to Cattle.—On this subject Mr Macgregor writes: "I generally give my cattleman three assistants, he being responsible to me for them all. He takes entire charge of the artificial foods. Each man gets the same number of cattle tied and in folds, and they must all be finished with the morning feeding and cleaning by half-past eight at latest. Men and cattle are then allowed a short rest, after which grooming begins. All tied-up cattle are as regularly groomed as the horses, the cattle in the folds twice a-week. The great secret in feeding is regularity, the times the artificial foods are given being more important than the quantities. They should always be given at a time when the animal can assimilate them."

SUTHERLAND.

This county is chiefly pastoral. A fringe of it along the shore of the Moray Firth has some large arable farms, low lying, good in soil, in a fairly good climate, and well cultivated.

The Duke of Sutherland.

As a specimen Dunrobin Mains may be taken. It is in the

occupation of the proprietor, the Duke of Sutherland. It has 214 acres arable, and 312 of pasture, besides a quantity of rough wooded outrun. The arable land is medium loam on clay and gravel. The elevation is 50 to 200 feet, and the rotation a six-shift one. About 200 acres of grass and a very small quantity of turnips are consumed by sheep, the remainder by 100 cattle in summer and 150 in winter, 36 being cows. Aberdeen-Angus cows are kept for breeding calves, and short-horns for dairy purposes, the sires being both Aberdeen-Angus and shorthorn.

Rearing.—Twenty-five calves are reared. After being suckled by their dams they are weaned in September and generally put on foggage. When it is exhausted the winter ration follows—a small quantity of linseed-cake with cut turnips and straw. This is continued to the grass, when the artificial stuffs are stopped. They are begun again towards the end of the pasture season. The six-quarter-olds are only occasionally fattened.

Fattening.—Those that are prepared for the butcher come into the house at the end of October, and fattening begins at once with tares, cake, and meal. Cross-polls, when finished, at from twenty months to two years, weigh about 5 to 6 cwt., and sell for about £17; while grazing cattle from six quarters old to two years off the pastures sold last year from £12 to £16.

Bought-in Cattle.—Forty cross-pollled and shorthorn crosses are bought for fattening every year, at Inverness and at George-mas Market, Caithness, in May and June.

Fattening begins on the pastures. When they get bare at the end of the season, 2 to 3 lb. of cake are given in tubs in the fields. The animals that get into high condition on the grass are generally sold off in October. Those for winter fattening are tied up in stalls, which are considered preferable even to folds that are covered.

The winter ration is turnips, as many as the cattle can consume, with 3 to 4 lb. of bruised corn and cake. The feeds are two of straw, three of turnips, two of corn and cake. The quantity of artificial food is increased a little as the fattening gets near the finish.

The cattle are not washed or groomed. The selling-time is early spring, and home-bred beasts, it is believed, pay best.

Mr Alexander Cameron, Kirkton.

Kirkton is down on the plain, on the shore of the Moray Firth, and is in possession now of one of the most experienced men in cattle business to be found in the north of Scotland—Mr Alexander Cameron. He occupies 635 arable acres and 620

acres of pasture. Brown loam, and black soil on clay and sand, well cultivated, gives good crops, 150 cattle getting very nearly all the turnips in a six-shift rotation, while two-thirds of the straw come from oats. Eighteen cows, mostly Aberdeen-Angus, with an Aberdeen-Angus sire, bring up about sixteen calves, nearly all suckled.

Rearing.—The calves are weaned at the end of September, when about five months old, and fed on tares and turnips and a little oil-cake. Their winter ration is turnips and straw, with 1½ lb. of oil-cake per head per day up to the New Year. Then the oil-cake is discontinued.

The one-year-olds go to grass in May, but get no artificial feeding on it. They are housed again in October, and get turnips and straw for the second winter, and grass in the following summer, falling in then with the cattle bought at about two and a half years for feeding, and being fattened on turnips and straw, with about 4 lb. of oil-cake each per day and bruised oats. At about three years old they sell at 18 to 20 guineas.

Bought-in Cattle.—About eighty big cattle are bought in every year. They come from Caithness, between August and November, 2½-year-old shorthorn crosses, at from £12 to £16.

Fattening.—Fattening begins on the pastures without any artificial stuffs. The autumn food is tares and oil-cake, with straw. The winter ration begins in October, partly in stalls, partly in folds, but generally the animals are all finished in stalls. Mr Cameron says: "I begin with two small feeds of turnips given morning and mid-day, and about 1½ lb. crushed oats and 2 lb. oil-cake, the oats and cake being increased, as fattening goes on, to at the finish about 9 lb. to each daily, with a little hay. Some time after fattening begins, the feeds are, turnips at 7 A.M., cake and corn at 1 P.M., and turnips at 2 P.M., with straw.

The cattle are generally washed with Macdougall's dip when put in to fatten, and they are groomed every day at 10 A.M.

Selling is all at home, and at any time throughout the season, prices usually £19 to £21. Mr Cameron thinks home-bred cattle most profitable. He says the railway rates between the southern centres and Sutherland are too high for Irish or Canadian cattle to pay.

CAITHNESS.

Caithness is largely a breeding and rearing county in cattle. The bigger farmers fatten many of the animals they breed, but the middle-sized and smaller occupiers of land sell their young beasts at various ages, supplying the lengthy well-bred

and well-shaped crosses that feeders all over the country try to get hold of when they can be bought at reasonable figures.

Mr Geo. Jas. Davidson, Old Hall.

Old Hall is one of the large farms of the county—1000 acres arable and 1000 acres of pasture. The arable soil is light, with a stiff retentive subsoil. The pasture is wet, and inclined to encourage foot-rot in sheep. The farm, which is 50 to 80 feet above sea-level, with a northern exposure, is worked in six shifts with three grasses; and three-fourths of the grass and turnips are consumed by sheep. The grain crop is nearly all oats. Cattle number 160, and of these 35 are shorthorn and cross cows. Sires are shorthorns.

Calves.—Fifty calves are reared, some ten or more of them being bought at about 40s. each. Some are suckled, others fed from the pail. Two of the suckled calves are put to one cow. The pail-calves in about two weeks are worked up to their full allowance of milk, which is 9 or 10 pints a-day. For twelve weeks it is full milk, newly milked; afterwards it is skimmed milk. When the calves come to some strength and age their milk is mixed with broken linseed-cake well scalded with boiling water.

At twenty weeks all the calves are weaned, and fed with tares and linseed-cake.

Winter Keep of Calves.—About the beginning of October they are put on their winter-feeding, which is turnips, straw, and cake, the cake—about 2 lb. to each—being given in the morning. The artificial stuffs are continued up to the grass, but no longer.

Next Summer.—The pastures are partly sown grass and partly natural. No house-feeding in summer is practised. Housing of the six-quarter-olds takes place about the 1st of October, and fattening commences about the middle of December.

Bought-in Cattle.—Besides the farm calves, added to by ten bought in, and all reared up for fattening to be sold at two years old, about forty cattle are purchased for fattening every year from small holders over the county—crosses off shorthorns, about eighteen months old, at from £5 to £9. The summer keep is grass on the fields, the rough pastures being largely resorted to in the autumn.

Fattening.—The winter feed begins about 1st October, the feeding cattle in stalls, the young ones in folds. It is a limited supply of turnips, with straw and artificial stuffs—two feeds a-day of turnips, consisting of about twelve ordinary-sized turnips to each animal every time, first at 6 A.M. and again at 1 P.M. If turnips are scarce, only about half the usual quantity are allowed, the cake and bruised oats being increased.

Fattening does not begin till about the middle of December, and it is finished about April, the two-year-olds then coming to about 5 cwt. dead weight, and bringing £13 to £15.

The selling is chiefly at home by private bargain. The fattening cattle are washed with carbolic soft-soap, and occasionally groomed.

Mr Geo. Brown, Watten Mains.

Watten Mains is in the same neighbourhood as Old Hall, and extends to 500 acres arable, with 30 acres of old meadow-pasture. The arable soil is loam on sandstone. The elevation is about 200 feet, the exposure south. The five-shift rotation is followed, and all the grain crops are oats. Half the grass and turnips go to sheep, the other half to cattle, which number ninety to one hundred. Of these twenty to twenty-five are cows, shorthorn and crosses of shorthorn, the sires shorthorn.

Calves.—Twenty to twenty-five calves are reared, and a few are sometimes bought at twelve weeks old at from 70s. to 90s. Shorthorn bull-calves are suckled by their dams. Part of the others are suckled also, two on each cow. Some are fed from the pail, getting, after they are two to three weeks old, 9 or 10 pints of whole milk, newly milked, per day. When milk becomes scarce about a third of this allowance is withdrawn, after the calves are six weeks old, and oil-cake gruel substituted for it. No skimmed milk is used.

Weaning and after.—Weaning-time is at twelve weeks old. The calves are generally early, and have been taught to eat cake and turnips before the milk is withdrawn. Their feeding at weaning-time is oil-cake ground small, with a small quantity of bruised oats and bean-meal. They run all the summer on good grass before and after weaning, and are taken in at night, each getting $\frac{3}{4}$ to 1 lb. of cake daily.

Wintering Calves.—Their winter feed is 40 lb. turnips each per day, with 1 lb. cake and $\frac{1}{2}$ lb. of bean- or pease-meal, and oat-straw *ad libitum*. The artificial stuffs are given in the morning, and continued up to the grass, but not on the pastures. Fattening at two years old is not practised. The animals are kept for stores.

In their second winter their feeding is 60 lb. turnips each per day, with 2 lb. of cake or oats mixed. Selling takes place in the summer after the second winter.

Mr John Miller of Scrabster.

Scrabster is a very large holding owned and occupied by Mr John Miller. It extends to 2200 acres, 1400 acres of which

are arable and 800 pasture. Of the arable land 450 acres are in permanent pasture and 950 in cultivation. The soil is loam inclined to clay, the poorer portion being peaty mixture. The rotation is six shifts with three-years' grass, the grain crops being wholly oats. Three-fourths of the grass and one-half of the turnips are given to sheep, yet the cattle number 180 to 200. Only twelve cows are kept to give milk for the house and servants. Their calves are sold.

Bought Cattle.—The young cattle are all bought, mostly as one-year-olds, with a few two-year-olds. They are purchased in the county. The one-year-olds get no artificial food on the grass. They are on the pastures till October, then get turnips. They are housed about 20th October, and all tied up. Fattening cattle are never loose. The young animals are allowed a run loose daily till the New Year; then only to water till feeding starts.

Fattening.—This is begun about 10th February, and finished in May or June. The regular fattening winter ration is 80 lb. of turnips, increased to 120 lb., but no beast allowed to get too many for the state of its stomach. To this there is added cake and oats bruised and mixed half and half, about 2 lb. at first, increased to 4 lb.

The feeds are: 6 A.M., half cake and corn, then straw and turnips; 11 A.M., straw; 1 P.M., turnips and straw; 4 P.M., turnips and straw; 8 P.M., half cake and corn with straw. Some forty of the worst of the cattle get only straw, with 2 to 3 lb. cake and corn mixed. They are fattened in the following summer, and may get 2 lb. of cake on the grass in August, September, and October.

Only occasionally is an animal washed. The tied-up cattle are groomed every day at 11 A.M. Sales are chiefly in Aberdeen and Edinburgh.

Mr D. Innes, Borlum.

Borlum is a large farm in the Reay country. It extends to 600 acres arable, and 28,000 acres of hilly, moory, and natural pastures. The arable land is black loam on sand or rock, 70 to 80 feet above sea-level, with a north and east exposure. The five-shift rotation is followed, and half the grass and turnips is consumed by sheep. The grain crops are nearly all oats, with a small quantity of bere. The cattle number one hundred, and of these forty are cows, partly pure-bred Aberdeen-Angus and partly shorthorn crosses. The sires are Aberdeen-Angus.

Calves.—Forty to fifty calves are reared, all calved on the farm. The pure-bred Aberdeen-Angus calves are suckled by their dams. The cross calves are milked from the pail. At

three weeks they are up to their full allowance, which is 12 to 14 pints daily. Whole milk, newly milked, it is for the first four and a half months, then skimmed milk for a month or so, warmed and mixed with bere-meal made into porridge, which has good effect. The suckled calves are weaned at seven months and fed with tares, oil-cake, and grass. The pail-calves are weaned at five and a half months, and get bruised bere, oil-cake, and grass.

Wintering Calves.—About the 1st of November the calves are all tied up in their stalls for the winter, and then their feeding is turnips, bruised oats, oil-cake, and straw. The oil-cake mixed with the bruised oats is the morning meal. The winter ration is continued unchanged up to the grass.

Summer and Winter Methods.—No artificial stuffs are given on the pastures, which are partly sown grass, partly natural. No house-feeding in summer is practised, except for the young bulls. The six-quarter-olds are housed about 1st October, but they are not fattened. Their winter keep is turnips and straw, oil-cake and bruised oats. They are sold in spring when two years old at £12 to £16. Sometimes, however, they are sold in spring at one year old, bringing £10 to £12. Mr Innes writes: "This is not a feeding county as a rule. The best young cattle are sold as one-year-olds. The others are kept as stores, and sold the following spring, when two years old, still as stores, or kept to be fattened the following winter, when they are on the verge of three years old."

"The large farmers do not, as a rule, rear their own cattle, but buy young cattle from the crofters and middle-sized farmers. This farm is not a good example of the others, as it is mostly a sheep one."

CONCLUSION.

Arrived not quite at John o' Groat's House, but very near to it—at the shores of the Pentland Firth, a little farther west—I may now look back over the eight counties that lie between this point and the Grampian mountains. They are picturesque enough, and much good and fertile soil is to be found in them, as well as some sunny spots where the cultivation of the land can be followed with a fair amount of certainty as to favourable results. But considering how much there is in these counties of second class and even of inferior soil, and over how much of them an inhospitable climate prevails, the spirit, the enterprise, the capacity, the close attention, and the success shown in the management of the cattle industry are truly remarkable.

One noticeable feature in it all is the comparatively small number of cattle that are now to be found on the pastures,

especially in the county of Ross, which is perhaps more largely a fattening county than any of those on either side of it. As a rule, the grazing of cattle has not been profitable for a number of years past. Some one must bring them over the summer, but for home-bred beasts that is chiefly done up amongst the hills, where land is not so highly rented as in the low country. Down on the plains, where the soil and climate are better, and where the factor takes away a larger share of the profits, farmers are compelled to work more or less at high pressure in order to get ends to meet when the year comes to a close. They must adopt the methods that will cover their larger outlay, and avoid everything that money will not come out of.

But it is worthy of notice also, that some of the larger feeders in Ross-shire, who have for years past been following exclusively the fattening of cattle after the most advanced and liberal methods as their chief source of revenue, are talking now of turning more than they have been doing to the breeding and rearing of their own cattle. And there is this year a noticeable change in resorting to home-bred cattle for fattening, in place of those that come over the seas. This has been caused by the lower prices than formerly at which they could be bought. For some time past farmers were driven to English, Irish, and Canadian cattle, by the prices of home-bred beasts suitable for fattening being so high in comparison with the value of beef, that there was nothing to be made out of preparing them for the butcher.

In a closing word, warmest thanks must be offered to those who have so courteously let their methods of managing their cattle be known, and a hope expressed that the information contained in these pages may be found interesting and useful.

SHEEP ON ARABLE LANDS.

By WM. SUTHERLAND, Peel Farm, Tibbermuir, by Perth.

INTRODUCTORY.

FOR the last fourteen or fifteen years matters agricultural in Britain have been, as too many of us know to our cost, on what Cousin Jonathan would term "the down grade." Produce of every description is, of course, liable to fluctuations in value—ups and downs are unavoidable; but, unfortunately, so far as farming products are concerned, prices seem nowadays to have

acquired an irresistible impulse to glide constantly onwards in the wrong direction. The tide has been long on the ebb; surely it must now be near the turn.

High Prices for Sheep.—Until within the last three years there was one notable exception to the downward movement, and that lay in the mutton trade. Towards the close of the "eighties," sheep, both store and fat, were, indeed, phenomenally high in price when compared with the rates then current in the cattle-markets, and there seemed no good grounds for concluding that any very great alteration in value was likely to take place in the near future. The consequence was that many farmers, who had previously done little or nothing with sheep, went in for breeding flocks, seemingly labouring under the impression that the balance from that department of their business, at least, was certain to be on the right side.

Fall in Prices for Sheep.—Fate, however, evidently determined to illustrate once again the truth of the old lines—

"The best-laid schemes o' mice and men
Gang aft a-gley"—

interposed, and the result is, that the autumn of 1892 shows an average fall in the value of the various classes of sheep of at least 50 to 60 per cent, compared with the prices current three years ago.

The reasons for such a sudden, and, to many, almost ruinous downfall are hard to determine. Increased production at home has, no doubt, had a certain influence in the matter. Foreign importations can scarcely be held accountable for more than a small fraction of it, since they are comparatively little larger now than they were in 1889, when the mutton trade was at its best.

It has been suggested that the spread of vegetarian ideas has also had a bearing on the matter. If, however, that movement has made any progress, we reckon that its influence on the sheep trade can only be regarded as something akin to the proverbial "drop in the bucket."

Another would-be authority declares emphatically that all our ills—cheap mutton included—are due to the weather. Had the clerk in that department only kept on his good behaviour all would have gone well with farmers; high prices, well-filled purses, peace and comfort, would have been the rule, instead of, as they unfortunately are, the exception.

Whilst all these agents may have contributed their quotas towards the production of the present unsatisfactory state of the sheep market, it seems to us that there must be some other as yet undiscovered influence at work in the matter, since the

whole of these combined are insufficient to account for the excessive fall which has taken place.

No Reason for Despair.—But, be the “missing link” what it may, we do not think that there is any good reason for taking a wholly despondent view of the situation. Sheep-farming is by no means played out in Britain yet, and, whatever pessimists may say to the contrary, we view the present low rates as only temporary, and firmly believe that ere the world is very much older a considerable portion of the lee-way will be made up.

An old Scottish proverb has it that “burnt bairns dread the fire.” Very many of those who only took to sheep-farming when prices were at their highest three years ago have had a somewhat bitter experience since then, and, to use the expressive words of one of themselves, have got “fairly disgusted” at the business, and have cleared off their stock, or are in process of doing so. In course of time this will so far tell in favour of those who cling to their old course; and in future days, when they put “bad times” and “good times” together, we fully expect that they will be able to say of their flocks, as they have had reason to say in the past, “there’s money in them yet.”

Foreign importations may increase; indeed the certainty is that they will do so, since, in addition to the twenty-one refrigerating establishments at present in existence in New Zealand and the river Plate, and capable of freezing upwards of six million carcases annually, other works are in course of erection in the same districts, with a capacity for handling a further two millions yearly. But, in spite of this, we incline to the belief that, given fair-play, British breeders, or at all events *Scottish* ones, will hold their own against the world.

Branding Foreign Meat.—We must, however, remark that some diversity of opinion seemingly exists as to what constitutes “fair-play” for the agriculturists of this country. Into controversial matters we do not at present wish to enter; but there is one point vitally touching the interests of British breeders which we cannot pass over unnoticed, and we think that all who have any knowledge of the subject will readily coincide with our views of the matter. In connection with the foreign meat trade, it is a matter of notoriety that at the present moment the great bulk of the imports fall into the hands of unscrupulous middlemen at a merely nominal rate, and is disposed of by them to consumers as British produce at exorbitant profits. Were it made compulsory that all imported meat offered for sale be labelled as such, or, better still, were it all *branded* ere being permitted to leave the port of landing—which would more effectually prevent any deception on the part of the seller towards the buyer, provided the latter made use of his eyesight—a decided boon would be conferred on home pro-

ducers. Consumers who wished home-fed mutton would then have the satisfaction of knowing that they were getting what they paid for; and others who are contented with second-class meat—under which head most of the imported mutton must be classed—would be able to supply themselves at much lower retail rates than prevail at present. The reduction thus enforced would work directly to the home-feeders' benefit, as the downfall in price would no doubt lead to increased consumption, and the pressure of foreign competition would be less severely felt by feeders of prime home mutton.

SHEEP STOCK ON ARABLE LAND.

The method of stocking adopted on arable land farms is usually regulated by the system of cropping adhered to. In some instances the opposite plan is followed, the course of cropping being adapted to the requirements of the sheep; such instances, however, are the exception rather than the rule.

Breeding flocks may be classed under three heads—Standing, Running, and Flying flocks.

Standing Flocks.—These are kept at the proper level, so far as numbers are concerned, by the annual retention of sufficient of the best of the ewe lambs to fill up the vacancies caused by the drafting of the aged and faulty ewes, the latter and the balance of the produce being sold off, fat or lean, according to the capabilities of the farm. Standing flocks are necessarily pure bred—that is, both ewes and rams are of one breed.

Running Flocks.—These are maintained by the purchase annually of the requisite number of gimmers, or, it may be in some instances, ewe lambs, to make good the voids caused by weeding, the balance of the produce and the cast ewes being disposed of as in the former case.

Flying Flocks.—In the case of flying flocks, fresh ewes, generally casts from hill-farms, are bought in annually for crossing purposes, and both ewes and lambs are usually disposed of to the butcher in the following season, although, in some instances, the ewes are sold just before lambing, and, in others, shortly afterwards, with lambs at foot.

Bought-in Sheep.—In other quarters no breeding flocks are kept—store sheep being bought in for the consumption of the root crops during winter, and the pasture during the summer months.

Letting Crops for Sheep.—On some farms, again, the occupier keeps no sheep of his own, but lets his crops to dealers for consumption on the ground. This latter system is, however, by no means a desirable one, save in very exceptional circumstances.

Farming is not altogether a "money-coining" business nowadays, and the farmer's pockets are usually sufficiently capacious to hold all the profits that can possibly be gathered in from the various branches of his calling, without his sharing them with oftentimes unnecessary middlemen. No doubt by letting the crop for consumption by other people's stock one makes sure of getting a certain return for past expenses, without further risk or trouble. At the same time, it should be borne in mind that "a bird in the hand" is *not always* "worth two in the bush." If there is profit in the business to the dealer, the converse holds equally true,—there should be to the grower, were he to stock the land himself.

In dealing with our subject, since many of our remarks apply to breeding and feeding stock alike, the best method of procedure may be, in place of confining ourselves to the consideration of the treatment of the one class for the year over, and then taking up the other, to keep both descriptions in hand at once, and deal with the various most important points in their management as they successively claim attention throughout the various seasons of the year. It will be convenient to commence with the

AUTUMN.

Autumn may be said to form the starting-point of the flock-master's operations for another "annual round." In the case of a breeding flock, the point most deserving of attention at this period is the

Flushing of Ewes.

The flushing or forcing of ewes, for a few weeks previous to, and during, the time the rams are running with them, is pursued with the view of getting a heavier crop of lambs than could otherwise be effected.

The query has been frequently put, "Does flushing pay?" Various matters must be taken into consideration ere a reliable answer can be given.

In the case of a *standing flock* we have very little faith in flushing, having always obtained the best results—taking the average of a series of years—by keeping the ewes at as nearly as possible a steady level of condition all the year round. Flushing for *one* season has indeed brought about a larger yield of lambs, but repeated with the same sheep the following year the practice invariably ended in disappointment.

Flying Stocks, however, come under a different category. Such ewes, as we have already said, are usually the casts of hill

flocks, bought up with the view of rearing a crop of cross-bred lambs, and being then fed off for the butcher; and, as they are generally in poor condition when purchased, by flushing them they will both take the ram earlier and produce a better crop of lambs than could otherwise be looked for.

When flushing is practised it is essential that the condition of the sheep be well kept up afterwards; if this point is not attended to, the results of flushing will be found detrimental rather than beneficial when the lambing season comes round.

Aftermath, rape, and other green foods all come in usefully for flushing; failing these being available, a moderate allowance of oats and cotton-cake answers well; but, as a rule, the less purchased food employed for this purpose the better, as a heavy outlay for such substances soon runs off with the extra profits likely to arise from their use in ordinary circumstances.

The Topping Season.

The date at which the rams are let loose amongst the ewes must, of course, be regulated by the time at which it is desired to have the lambs make their appearance—this, of course, depending greatly on the nature of the food-supply available for the ewes in the early spring. When abundance of succulent food is in hand, the earlier in the season the lambs are dropped the better. Those coming to hand by the beginning of February will, if properly attended to, realise almost double the price per lb. weight of those dropped two months later, coming, as they will, into the market when supplies are short.

It is desirable to keel the breasts of the rams daily at this period. By this means the ewes that have been served are readily recognised; and by placing a distinctive mark on those served in each successive week, they can be drawn out in lots as they fall due to lamb, in place of the shepherd being under the necessity of keeping the whole flock under observation at once, as would be the case were this precaution neglected.

Fattening Sheep.

Owing to the failure of the grass in the autumn months, feeding sheep require to be carefully looked after to keep them improving in condition. Even should there be plenty "roughness" amongst their feet, the pasture loses to a very great extent its nourishing properties by this advanced period of the year, and hand-feeding is consequently essential if improvement is to be made, or even deterioration prevented.

Sheep to be kept on for a time should be broken in to their coming change of diet by getting a few yellow turnips daily

spread out and cut for them on the leas. Any that are smaller and leaner in condition than the bulk of the flock should be separated, and more generously treated. If left with the others and fed, as should always be the case, with only as much in the shape of "dainties" as they will at once eat up, the weakest are very apt to "go to the wall." When it can possibly be carried out—which, however, is frequently impossible—it is well to have the sheep graded in lots, according to condition. Those that are furthest forward can then be more liberally fed than the others, and quickly got rid of, and the same treatment accorded to the other lots in succession.

Food.

As regards this part of our subject, we need only refer at present to the more concentrated feeding-stuffs in use for sheep. To our mind, by far the most profitable substances for general use, at all seasons of the year, are those grown on the farm. There are no doubt many excellent cakes—simple and compound—meals, and other mixtures, which may frequently be called into service, to a limited extent, with profit to the feeder; but in these days of cheap grain, we think their employment might be very much curtailed, with advantage to the farmer.

Home-grown produce is nowadays a perfect drug in the market. With a fair quality of oats at 14s to 15s, barley 15s. to 18s, and wheat 20s. to 23s. per eight bushels, the sheep-feeder may fairly bid defiance to the cake-manufacturer. At such prices, grain—wheat especially—is pounds per ton cheaper, feeding value considered, than any other substitutes procurable.

Grain of all varieties should be ground into rough meal before being fed to sheep; given whole, it is apt to give rise to inflammatory attacks.

Food for Different Classes of Sheep.—In using concentrated foods, care should be taken to adapt the ingredients to the purpose for which they are required. Growing sheep should be supplied with the varieties best fitted for the development of bone and muscle; fattening animals with those which will most quickly cause accumulation of flesh and fat—otherwise much of the food will inevitably be as bad as thrown away.

Balancing Food.—The standard of perfect foods, as given by competent authorities, is the presence of nitrogenous and non-nitrogenous matter in the proportion of about 1 to 5 for breeding and growing sheep, and 1 to 8 for fattening animals. It may appear a somewhat difficult matter to hold the balance exactly fair so far as these percentages are concerned, but a careful study of existing tables as to the average composition

of grain, cakes, and other feeding-stuffs, will prevent any very serious error being made in that respect.

Change of Food.—There is another point in regard to these concentrated foods which we think seldom receives sufficient attention. It has been frequently remarked that sheep are fond of a change of food; but we are doubtful whether many feeders are aware of the fact that any one kind of food, no matter how nourishing it may be, if taken continuously for a lengthened period, loses to a very great extent its power of imparting nourishment to the body. The truth of this assertion is, however, unquestionable, and experiments are only required to demonstrate its accuracy.

Dipping.

During favourable weather towards the end of autumn all the sheep stock on the farm should be carefully dipped, for the twofold purpose of ridding the animals from existing parasites and protecting them from future attacks during the winter months.

A thoroughly reliable poisonous dip should be employed—non-poisonous preparations are in great measure useless, their effects being of a very transient nature. At best they only kill the living keds (even in this respect many of them prove futile, unless used at very much over their directed strength), leaving the eggs, from which future generations will spring, unharmed, and the invariable result is, that in a few weeks the sheep are as badly infested as if they had never undergone the operation.

In ordinary circumstances, where the flock are small in size, the sheep are usually lifted into the dipping-tank; when, however, more than 400 or 500 have to be dealt with at one time, the swimming-bath offers a quicker, more economical, and, at the same time, more thoroughly effective method of performing the operation. A well-known English firm have lately introduced a square swim-bath in which 1500 sheep can easily be dipped in a day's time, the assistance of only three men being required. The bath may be constructed of wood; but for a permanent erection brick and cement are preferable. Constructed of the latter materials, the total cost (exclusive of draining-pen) is somewhat over £1. This bath only requires to be seen in use in order to be appreciated.

Autumn Diseases.

Space will not permit any very lengthened reference in this paper to sheep diseases. A short allusion to those most commonly met with during the different seasons of the year may,

however, prove serviceable. And we may remark at this stage that very many of the troubles to which our woolly friends are liable would either be wholly prevented, or their ravages greatly lessened, by the provision of comfortable shelter during stormy weather, and by allowing free access at all times to a supply of rock-salt. It is in the autumn months that the foundation of all *parasitical disorders* to which sheep are subject are laid. The greatest care should therefore be exercised to keep the animals off wet land—where all such troubles originate—at this period of the year.

Hoose, liver-rot, and foot-rot are the most prevalent disorders during the autumn.

Hoose.—*Hoose*, or husk, as it is sometimes termed, is due to the presence of delicate thread-like worms in the lungs and air-passages, and is mostly confined to young sheep pasturing on old grass-lands. The disorder is characterised by more or less difficulty in breathing; the presence of a husky cough, more especially when disturbed; dryness of skin and wool; and bloodless appearance of the mucous membranes. If treated at an early stage the trouble is curable; but if long neglected death invariably results, usually from exhaustion caused by the purging which accompanies the latter stages.

Various methods of *treatment* have been practised, the ordinary one consisting in the administration of equal quantities of linseed-oil and turpentine (a table-spoonful for a dose) every second day for a week. Fumigation is also frequently resorted to as a remedy, the sheep being confined in an air-tight building, and subjected to the fumes arising from sulphur burnt on a red-hot shovel. Care is necessary in carrying out this treatment, otherwise the animals may be overcome and suffocated if too long subjected to the fumes.

A more effective method of dealing with the trouble has lately been introduced, the parasites being destroyed by the injection of a mixture of chloroform, turpentine, and carbolic acid into the windpipe, by means of a syringe armed with a hollow sharp-pointed needle.

Liver-rot.—This deadly disorder, due to the presence of flukes in the liver and bile-ducts, is most prevalent on purely pastoral farms, particularly in marshy, low-lying, and ill-drained districts,—“standing flocks,” confined wholly on arable lands under regular rotation of cropping, being, we may say, entirely free from it. When met with on arable farms it is usually where the “flying flock” method of stocking prevails,—the trouble having been contracted by the sheep on the land where they had previously been pastured.

In the early stage of the disease the mucous membrane of the eyes acquires a yellowish tint. As it progresses the eyes become

bloodless and watery-looking; watery swellings gather under the jaws; the wool gets harsh and lustreless, and begins to fall off; and foetid diarrhoea sets in, rapidly followed by death. Once the trouble gets fairly established in the system, treatment is useless.

As to *preventive measures*, there is nothing better than salt liberally applied to the pastures during the end of summer and beginning of autumn. If concentrated food is being given, a little salt may with benefit be added to it.

Foot-rot.—This disorder is unfortunately only too well known to the flockmaster, so that any description of the symptoms is quite unnecessary. Opinions differ as to whether it is contagious; for our own part we do not consider it so.

There are several very effective preparations in the market for the *cure* of it, but a mixture of equal quantities of butter of antimony and tincture of myrrh gives about as satisfactory a result as any of them.

Before applying any dressings, all diseased portions of the hoof should be removed, and after dressing the sheep should be kept up for an hour or two on dry straw, so that the application may take effect.

As a *preventive* of the trouble there is nothing better than to pass the sheep twice or thrice a-year through a shallow trough containing a depth of $1\frac{1}{2}$ inch of a solution of one or other of the best-known arsenical powder dips, in the proportion of one packet dip to one gallon water. The animals must be penned for a short time afterwards, to prevent any of the poison being carried to the pasture.

WINTER.

During the winter months sheep on arable land are to a great extent, frequently wholly, dependent on hand-feeding for their support.

All extremes and sudden changes in the matter of feeding should be avoided in the case of both breeding and fattening stock. As regards the former, high condition is objectionable; but the opposite extreme (which, we need scarcely add, is the most common) is even more so. The old adage has it that

“If by halves you nourish the dams,
You need only look for bad luck with the lambs.”

It is invariably in poor-conditioned flocks that the heaviest losses, both of ewes and lambs, occur.

Food supplied to breeding sheep should be the best of its kind, and given in sufficient quantity to keep them in fair thriving condition.

In general, turnips and hay constitute the bulk of the diet, a little cake and corn being sometimes added: the less of the latter, however, till after lambing the better, as it seems to be rather heating for the ewes; and if the hay is of good quality, and fed with a free hand, concentrated foods are unnecessary.

Particular care should be taken to prevent the sheep being at any time supplied with frosted turnips or overabundance of any cold succulent food, since the free use of such almost always leads to disaster.

Sheep on Turnips.

The ordinary method of folding sheep on the unstored turnip crop is not by any means deserving of commendation. The main arguments advanced in favour of the practice are that it saves trouble and expense—both very desirable points, no doubt, *provided* no return was obtained for extra expenditure in those respects. The fact, however, cannot be gainsaid, that the very reverse generally holds true.

It is simply impossible for sheep to make satisfactory progress when confined on soaked and waterlogged ground and subjected to a dirty diet, as they are when netted on the turnip break during the prevalence of wet weather, or on hard frozen roots, which they have to contend with when severe frost prevails.

The greatest gain in feeding turnips to sheep is invariably got by storing the roots and supplying them fresh daily to the animals in a clean and cut form: for hoggets, indeed, this system is indispensable in the early spring, if loss of condition is to be prevented, as at that period they are shedding their teeth, and are, consequently, unable to break the turnips for themselves.

By following out this system, the animals get their food in a cleanly state, no matter what sort of weather prevails, and consume it with little or no waste; and their owner is in the happy predicament of being to a great extent independent of the weather—a very desirable point when we bear in mind that in some severe seasons the root crop has been rendered almost totally useless by long-continued frost.

When confined on the turnip-land in wet seasons a deal of dirt is swallowed with the food, and this in course of time accumulates in the pouches of the stomachs to such an extent as in very many cases to interfere with their action, and eventually cause death from inflammation.

The evils of the ordinary method of consuming the roots by sheep could easily be minimised to a considerable extent by storing a portion of the crop for consumption on the turnip-break during frost, or on the leas when long-continued wet weather

prevailed; but our ideas run in favour of storing the whole, and running no unnecessary risk.

Food to accompany Turnips.—In many quarters it is customary to confine the sheep to turnips with no other food save an occasional bite of straw or hay, “to dry their teeth.” Such treatment is, to say the least of it, very injudicious, both for the sheep and the pocket of their owner.

Were we to judge from their practices, we could only come to the conclusion that very many sheep-feeders are ignorant of the fact that the ratio of nutritive elements present in food of any description always decreases in proportion as the watery elements increase. The greater the quantity of water present in the food, the more the animals must consume of it ere they can procure a sufficiency of nutritious matter. The fact that turnips contain, on an average, about 90 per cent of their weight of water, and that too often in an ice-cold state, should of itself be sufficient to convince any thinking person that they are, when used alone, a very undesirable diet for sheep, and only too well fitted to cause disorder in the digestive organs, and thus induce weakness and debility.

So far as the turnip crop is concerned, the long and short of the matter is, that sheep cannot thrive to the greatest profit if fed wholly on it; neither can they do so on concentrated food, since they must always have sufficient bulk to satisfy the appetite. The true road to success lies in a judicious combination of the two methods—a reasonable limiting of the root supply, and a substitution of sufficient fodder and box-feeding to fill the void thus caused. By adopting this system a greater head of stock can be carried on the same acreage; and, as a rule, the bigger the flock the greater the profit.

In giving concentrated feeding during the winter months, we find it beneficial to feed one-half the allowance the first thing in the morning and the other the last at night. The sheep keep healthier and do better than when the food is given all in one lot during the daytime.

Shelter.

On arable land the matter of shelter is too frequently neglected, and in many instances with greater ill effects than in the case of hill-farms, owing to the class of sheep kept being generally of a less hardy nature.

We are aware that in some quarters the impression prevails that any pampering in this respect is detrimental to the welfare of the sheep, by leading them to be less self-reliant in their habits, and thus affecting their hardiness of constitution. That there is a little foundation for the idea, so far as it applies

to hill-flocks, we readily admit; but in our opinion the matter should be viewed from a different stand-point when the smaller-sized and more valuable low-ground flocks are concerned. It is distinctly beneficial for all such sheep to be able to resort during the prevalence of inclement weather to dry and warm shelter for repose; and the best proof that the animals appreciate provision made in this shape for their welfare is supplied by the fact, that once they obtain access to it they afterwards resort to it regularly of their own accord.

There is no more effectual method of causing loss of condition—apart, of course, from the withholding of food—than by subjecting the sheep to exposure during long-continued stormy weather: such exposure is in reality a predisposing and exciting cause of disease. As to the best method of providing shelter, local considerations must determine.

Temporary erections are most suitable on arable land, since the rotation of cropping leads to frequent removals. An open wire fence will, if merely lined closely with straw, so far “cut” the blasts of winter, although not affording protection from the elements above. The addition of a few flakes or hurdles, securely attached at the back to the top of the fence, and supported in front by net or other stakes driven firmly into the ground, with a good coating of well-drawn straw for thatch, will make things much more comfortable and satisfactory.

Such “shelters” should, of course, only be run up on the highest portion of the fields, and on slightly “brae-set” ground if possible; and abundance of clean straw must be available for littering purposes, otherwise foot-rot might cause trouble.

Diseases in Winter.

The troubles most frequently met with during the winter season are *braxy* and *dropsy*.

Braxy.—Braxy is very prevalent in some districts in winter, and is most common amongst highly-fed sheep confined in rather close quarters. As a rule, death takes place almost instantaneously, no symptoms of illness being observable previously. The animals are usually seized during the night-time.

When losses occur in this way, it is advisable to change the diet for a time and allow more space for exercise.

Dropsy.—The symptoms of this disorder closely resemble those of liver-rot; indeed, the one trouble is frequently mistaken for the other until a post-mortem examination reveals the difference. In dropsy, the belly is usually more distended, and there is not the same tendency to loss of wool as in liver-rot. Innutritious watery food is the usual cause. Strengthening tonics, composed of gentian and iron sulphate,

occasionally prove serviceable; but prevention is in this, as in many other troubles, easier than cure.

SPRING.

The Lambing Season.—The most important requirements to ensure “good luck” during the lambing season—always supposing that the treatment of the flock previously had been in all respects judicious—are a good shepherd, suitable shelter, a sufficiency of proper food, and a supply of medicines fitted for counteracting the disorders to which the sheep are liable at this time.

Shelter for Lambing.—The importance of having proper shelter available, more particularly when the lambs are dropped early in the season, cannot be over-estimated. In many cases which have come under our notice more serious losses have arisen from neglect in this respect than from all other sources combined.

On most farms some buildings exist which might easily be taken advantage of for lambing purposes were a little ingenuity exercised in arranging them internally. Failing any such, conveniently-arranged sheltering-places, either of a permanent or temporary nature, should be erected, and care taken that they are kept in a cleanly state throughout the lambing season, otherwise a considerable risk is run of propagating disease. The most effectual method of preventing such outbreaks is by ensuring proper ventilation, keeping the sheds well littered with straw, and sprinkling the interior occasionally with a weak solution of carbolic acid.

The size of the buildings must, of course, be regulated by the number of ewes that require accommodation. When they have been marked weekly as served, less room will of course suffice than when that point has been neglected. One portion, affording access to an uncovered enclosure, should be reserved for the accommodation of the unlambed ewes at night. A few pens of sufficient size are desirable for the isolation of the newly-lambed ewes for a day or two until the lambs gain a little strength, and room should also be available for sheltering the whole flock during stormy weather until the youngsters are at least three or four weeks old.

A separate shed, containing a few pens, ought to be reserved for ailing sheep requiring special attention, and abundance of straw should be at hand for bedding.

The ewes as they fall due to lamb should be kept in the neighbourhood of the lambing-fold during the daytime, and confined in the latter at night, and ought to be seen to regularly

at intervals of not over two hours. Immediately after lambing, and previous to removal to the small pens, the udders of the ewes should be examined, and any wool likely to interfere with the lambs when sucking ought to be clipped off; this precaution almost wholly obliterates losses from "wool-ball." While advocating the provision of comfortable shelter during lambing time, and so long as there is any risk of inclement weather being experienced, we do not by any means believe in cooping the sheep up under cover if the weather is at all suitable for letting them outside. The lambs will make much better progress by getting fresh air and exercise, and one must therefore just exercise his own discretion as to when they should, and should not, be under artificial protection; but care should be taken always to act on the cautious side.

Difficult Lambing.—When many ewes have to be dealt with, and more particularly when they are of the larger and softer breeds, some instances of difficult lambing are sure to crop up. In all such cases the shepherd must determine for himself, after examination, as to what is the best method of procedure in order to effect delivery; but in every instance before handling the ewe the hands should be lubricated with carbolic oil.

When the slightest difficulty has been experienced in lambing it is advisable to adopt treatment fitted to ward off inflammation, which is very apt to supervene. To that end 2 drachms laudanum should be given to the ewe in a little linseed-oil, and about 2 fluid ounces of carbolic oil (strength 1 to 20) injected into the womb. If much exhausted, careful nursing will be required to bring her round.

In cases where gimmers show a tendency to disown any of their lambs, or when, from one cause or another, it is needful to transfer lambs from one ewe to another, the readiest method of leading to a friendly agreement is by haltering the ewe for a few days in a small pen, leaving the lambs beside her, and occasionally rubbing them thoroughly over with her milk.

Disorders in Lambing.

Amongst the disorders prevalent about the lambing season the most common are—abortion, usually taking place a month or two before the ewe's full time; awalding; inflammation of the womb; sore teats; and white scour.

Abortion.—There is nothing more annoying to the flock-master than outbreaks of this trouble, entailing as it does the loss of a year's keep on the ewes affected. Premonitory symptoms are rarely observable, although in some cases a slight dulness may be apparent. The usual cause is excitement by dogs; in other cases it results from injuries received in breaking through

fences, and also from the use of unsuitable food—such as frosted turnips. The trouble is not contagious in sheep, still animals that have aborted should be separated from the flock for a time, and a dose of laxative medicine given them should it seem necessary.

Awalding (or rolling over).—Sheep addicted to this troublesome and dangerous habit are almost invariably infested by keds, and thorough dipping is consequently the most effective remedy. Heavy losses are sometimes experienced amongst in-lamb ewes from it, and also amongst highly conditioned sheep just before clipping-time. The animals being unable to extricate themselves from their awkward predicament, come to a rapid death if left unassisted.

Inflammation of the Womb.—Heaving or straining is generally the forerunner of this deadly disorder, which is usually due either to the sheep being in too high condition or to injuries inflicted on them when giving assistance at lambing. The preventive treatment previously mentioned reduces the liability to attack; but when cases of heaving do occur, 2 drachms laudanum and 2 ounces Epsom salts should at once be given in a little warm gruel, and a strong solution of slightly heated carbolic oil injected into the womb. There is a still more fatal type of inflammation, which progresses so rapidly that treatment proves of no avail. Both types of this trouble are very infectious, and, consequently, the work of skinning any sheep falling victims to it should devolve on some other person than the shepherd, as, despite the greatest care, he will be apt to carry the disorder to other members of the flock.

Sore Teats.—These are somewhat common during cold stormy weather, and if neglected usually lead to garget, or inflammation of the udder. Frequent application of a mixture of glycerine and olive oil is the best treatment. Should garget of a serious type ensue, it will be necessary to administer 2 ounces Epsom salts in gruel, foment the udder with warm water, and rub twice or thrice a-day with olive oil and turpentine (in the proportion of 1 to 10). The lambs of course must be removed, and the ewe frequently milked by hand.

Should abscesses form, open when ripe, poultice with linseed, and bathe frequently with hot water and carbolic soap.

White Scour.—This is the most fatal disorder to which young lambs are liable, and arises from the coagulation of the milk in the fourth stomach, the whey alone passing off by the bowels. By withholding milk from the patient, and giving frequently a little linseed tea containing a small quantity of brandy, a cure may occasionally be effected.

Changing Food.—In the case of both breeding and fattening sheep, great care should be exercised in the spring months when

the change from the winter diet to the new grass is being brought about. Cases of diarrhoea very frequently crop up at this period. A small allowance of decorticated cotton-cake acts as a good preventive. In severe attacks the animals should be confined and kept solely on dry food for a time, and a table-spoonful of the following mixture may be given with benefit daily till cured: Powdered ginger and catechu, of each 4 drachms, opium $\frac{1}{2}$ drachm, prepared chalk 12 drachms, peppermint water $\frac{1}{2}$ pint.

Ewes with Twins.—Ewes having twin lambs should be kept apart from their less prolific companions, as to give them fair play they require to be more liberally treated.

Artificial Food in Spring and Summer.—During the spring and summer months concentrated food is usually at a discount for sheep-feeding purposes, the general impression seemingly being that it is unnecessary when abundance of grass is available. Much greater benefit is, however, derived from its use at this period of the year than during the winter months, as owing to the more favourable weather conditions less of it is expended in keeping up the heat of the animal's body.

Dipping in Spring.—Sheep-dipping is not by any means generally practised in spring; but we are fully convinced by our own experience that the expense incurred by doing so is, provided a proper dip be employed, repaid many times over, in the case of both breeding and feeding sheep, by the increased comfort experienced by the animals, and the improvement both in quality and quantity of wool.

Castration and Docking.—These operations are usually carried out when the lambs are about three weeks old. Castration should never be performed when the weather is either cold or sultry, a mild and moist morning being most desirable for such work. The mode ordinarily adopted is to cut off the tip of the scrotum, and press with the hands on the abdomen so as to bring forward the testicles, which are then drawn out with the teeth. A rather rough-looking method is frequently practised in various parts of Canada. The operation is performed in a second, and the animal seemingly suffers less pain than when operated on in the ordinary manner. A few trials of the system have proved very satisfactory; but we think it only practicable with very young lambs—say a week or so old. At all events, we would not feel disposed to operate on them in the same manner were they at the age at which castration is usually carried out.

The *modus operandi* consists simply in severing the scrotum and testicles close to the belly by one stroke of a pair of strong sheep-shears.

Sheep castrated in this fashion prove very handy for the

shearer should a "good rise" be awaiting on the wool at clipping-time, as by the ordinary method of castration the scrotum is usually the most difficult part of the body to get cleared of the wool.

Loss from Castration.—Elsewhere we have attributed the losses occasionally experienced after castration to one of three causes: hæmorrhage after the event; undue excitement, or ill-health, prior to it; the choice of unsuitable weather. We feel inclined, as the result of some cases that have come to our knowledge, to make an addition to the list, and class as a fourth cause "bad breath" on the part of the operator—arising either from his being in ill-health or from his having the night before the operation partaken too freely of "something stronger than water"—leading to blood-poisoning in the lambs operated on.

A mixture of carbolic acid and olive oil (1 to 20) is in general use as an application for the wounds caused by castration. We have, however, for some years used nothing but pure turpentine for the purpose—the operator moistening his mouth with it ere commencing work and applying just a few drops to the edge of the cuts—with the satisfactory result of never having had one death since adopting this plan. Docking is usually performed immediately after castration, but may with advantage be deferred for a week or two.

SUMMER.

The summer months form one of the busiest seasons of the year for the shepherd on arable land farms, second in importance only to that of spring. The washing, clipping, and dipping of the sheep, the weaning of the lambs, the careful watching for maggot-struck animals, and innumerable other matters, keep him constantly on the move.

Washing.—The practice of washing before clipping-time has of late years fallen out of fashion to a very considerable extent in many quarters. Various reasons have been adduced for the change, some asserting that in the case of breeding ewes the custom proved objectionable by causing a diminution in the flow of milk, and thus affecting the progress of the lambs; whilst in regard to fattening sheep it has been suggested that the excitement inseparable from the operation induces a certain loss of condition.

Our own opinion, formed from frequent observance of the subject, is, that none of these suppositions have any very solid foundation. Possibly the most influential factor in leading to the change is the impression that if washing does not cause actual loss to the wool-grower, it does not at all events repay

him for the trouble and expense incurred in carrying out the operation.

Two years ago we experimented with the view of satisfying ourselves as to whether the practice was profitable or the reverse in our case, and the results of the experiment were the confirming of our previous opinion that in some instances it does, and in others does not, pay to wash. The truth of the matter seems to be, that each grower should be best able to judge for himself as to whether it is likely to be for or against his interests to perform the operation.

The sheep we experimented on were hogs and breeding ewes—the former divided into two lots and the latter into three. One sheep was drawn for each lot successively, and distinctly marked to prevent any possibility of error afterwards, and the greatest care was taken to have each lot as equal as possibly could be, so that the various methods might have a fair trial. The first lot of hogs was left unwashed; the second washed in the ordinary manner. The first lot of ewes were unwashed; the second washed in the usual way; the third first subjected to hand-washing in a soapy solution, and then thoroughly re-done in the ordinary manner.

Eight days after clipping was begun, and the results after weighing and disposing of the wool found to be as follows, reckoning 100 sheep in each lot:—

Hogs.

	Weight of Wool in lb.	Sold at per lb. <i>d.</i>	Expense of washing. <i>s. d.</i>	Net return.		
				£	s.	d.
Unwashed . .	749	9½	0 0	29	13	0
Washed . .	652½	10½	4 2	28	7	1

Ewes.

Unwashed . .	687½	8	0 0	22	18	6½
Washed . .	657½	8½	4 2	23	15	3
Extra washed . .	599½	9	13 4	21	16	5½

The unwashed wool in both sections realised rather over the then current rates, owing, no doubt, to its being extra tidily got up. Where washing is customary, the hand method is most general amongst arable-land flocks. A slow-running stream of sufficient depth, or gravelly-bottomed mill-pond, affords the most suitable place for the operation. After being washed, the sheep should be confined on clean pasture till shorn.

Eight days at least should be allowed to elapse between the time of washing and clipping, otherwise the wool will be deficient in brightness, owing to its not having had time to recover the "yolk"—an unctuous or fatty matter secreted from the skin.

Clipping.—Sheep on arable farms are invariably shorn

"round the rib." The clipping is usually performed in the open air, although sometimes done under cover. A clean pasture field forms the most suitable clipping ground, as when hampered for room, which is generally the case when the shearing is carried on inside, the work is not got through with the same speed or satisfaction.

Even when clipped on the pasture it is advisable to have a sheet under the animals to prevent any soil or dirt getting into the wool. The fleece should be removed perfectly whole, and freed from all objectionable matter before being tied up. This is usually done on the grass, but a much more perfect method is to have an open sparred platform to spread the fleece on: any loose particles of earth and other substances then fall clear of the wool in the process of folding and rolling it up. All stained locks about the tail end, and any loose and dirty tufts about the belly, should be removed and sold separately. Care should, in fact, be taken to prevent any possible ground for complaint regarding the manner in which the wool is got up for sale, as the presence of even one carelessly dressed fleece may spoil the sale of a whole clip should it chance to take the buyer's eye when sampling.

Dipping in Summer.—A month or so after clipping, all the sheep (lambs included) should be dipped to prevent the attacks of maggot-fly, which proves very troublesome during the heat of summer, particularly in wooded districts and where hedge-fencing exists. As we have previously remarked, non-poisonous dips are wholly useless for this purpose; indeed several of the carbolic preparations seem to furnish a peculiar attraction for the blue-fly, as we have observed sheep properly dipped in them attacked within a fortnight, and proving a source of constant annoyance until put through a poisonous bath.

It is also beneficial to smear the heads of the sheep occasionally during the hot season with a mixture of tar and powdered brimstone, to save them from annoyance by other "fleein' devils," as an old shepherd was in the habit of styling them.

Weaning.—The month of July is the usual time chosen for weaning. When practicable the ewes should be removed from the lambs, instead of the latter from the former, as the youngsters become reconciled to the inevitable much more readily when left on the ground they previously occupied. The ewes should, therefore, be removed as far distant from the lambs as possible, and, preferably, placed for a few days on the poorest pasture available, so that the milk may the more readily dry off them. Should any of them seem overburdened with it, a little should be drawn from them by hand. Neglect in this respect is a frequent cause of bad udders.

The *after-treatment* of the ewes will be dealt with in the paragraph on *Selection*.

After-treatment of Lambs.—As regards the lambs, their treatment, once they have got over the separation from their mothers, must be regulated by the end the breeder has in view for them. Be that as it may, they must, if a profitable result is looked for, be treated in the best manner possible; and we need scarcely add that the higher their condition when weaned, the greater the necessity for treating them well afterwards. Any subjection to "short commons" at this stage of their existence tells on them ever after.

The old doctrine, "received by tradition from our fathers," that sheep could not be profitably fattened until they had attained their full growth of frame, and that they should, therefore, be carried on on merely sustenance diet till that point was reached, finds few upholders in the present age. Feeders have become alive to the fact that the greatest profit in feeding sheep for mutton is gained while the animals are young, and the tendency is, consequently, all towards going in for early maturity. If carefully and systematically fed, sheep will, in the first year of their age, take on as much flesh as others attended to in haphazard fashion will do in double that time. Present appearances indicate that, so far as arable-land breeds are concerned, aged sheep (ewes of course excepted) will ere long be rarities in the fat market.

Sheep in Warm Weather.

During the warmest period of the summer months all needful work amongst the sheep should be performed in the cool of the morning or evening, and the animals left as much as possible undisturbed during the daytime; and, if at all practicable, some form of shelter should be provided, for fattening sheep especially, as the discomfort they experience from the burning rays of the sun in the open, and the hordes of insect pests that surround them, inevitably conduces to check improvement in condition.

SELECTION.

One of the most important steps towards ensuring profitable results in the breeding and fattening of sheep lies in the exercise of care and judgment in the selection of the members of the flock.

Really good sheep always give the best returns: they thrive on less food, and prove more profitable otherwise, than those of an inferior class. This holds especially true in the case of

breeding ewes, and the man who overhauls his flock annually with a free hand and weeds out all the faulty members is certain to come out better at the year's end than the one who neglects the matter, or only carries it out in a half-hearted fashion. It would not, of course, do to stick out for perfection in every respect in each member of the flock, otherwise most flocks would suffer a rather serious diminution in numbers; still the aim should be to get as near that desirable standard as possible.

A week or two after weaning is the period usually chosen for separating the casts from the keeping stock, and at that time it is, of course, easy enough to pick out all broken-mouthed ewes and those that are faulty in udders from garget or other troubles. The flockmaster should, however, keep his eyes on the ewes all the year over, since there are in every flock some animals that prove faulty in other respects than those we have just mentioned. Any that may have shown signs of weakness in constitution, that may prove poor milkers, or objectionable in other respects, should be at once marked for recognition for disposal with the other cullings. If such when observed are passed over with the remark, "Oh, we needn't trouble marking them now—we'll easily recognise them again," the likelihood is that the matter will be forgotten by the time the drafting period comes round, and that they will pass muster for another season, to the owner's serious loss.

As regards the *disposal of the cast sheep*, it is usually more profitable for the arable-land farmer to fatten them for the butcher than to sell them in store condition; but it is advisable either to have them in good condition at time of weaning and pushed quickly into the market, or, if in thin condition, to keep them only moderately well-fed for a time and then fatten up for disposal about the end of the year. Towards the end of autumn and in the early part of the winter season the markets are generally overstocked with ewe-mutton, which is consequently frequently unsaleable, save at ruinously low rates.

There are several other matters to which we meant to refer; but we fear that we may already have exceeded reasonable limits, and shall therefore conclude with the hope that our remarks, cursory as they are, may prove of interest and service to some of our readers.

THE "BLOCK-TEST" INQUIRY.

By GEORGE T. TURNER.

I HAVE pleasure in complying with the request that I should give my impressions on the returns which I have collected relating to cattle and sheep slaughtered from the Smithfield Club Show during the past five years. At the same time, I should have great diffidence in offering anything more than general conclusions; in fact, the nature of the evidence is such as to render anything beyond that very undesirable. My mission has been to obtain facts which, when recorded, might be of service to breeders and exhibitors of pedigree-stock; and I have been chary of inflicting my own deductions from them upon the public, other than as they have tended to support one or two previously conceived ideas in my own mind.

It is, of course, gratifying to me to know that the work has been well received; and the very general readiness with which information has been supplied by butchers shows that they are, as a rule, very willing to assist. It must be remembered that many of those who purchase prize animals from a show, like that of the Smithfield Club, are themselves farmers, feeders, and in some instances breeders; and whilst they would quickly resent any attempt to pry into their business, they have a fellow-feeling with the object of the inquiry. It is important to bear this in mind. They are interested in the improvement of all kinds of animals bred for food purposes, as it gives them a better article to sell; and they fully appreciate the educational advantage of the great fat stock shows held each year before Christmas, their share of the costly work consisting in paying high prices for prize animals—which entail upon them more or less loss—by way of advertisement.

Each individual return must have a certain amount of value to the breeder and the exhibitor (or feeder) of the animal or animals referred to, not only in itself but in its bearing toward other returns of animals of similar age and breeding. But the returns I have been able to get will not rightly lend themselves to any partisan conclusions respecting the relative merits of the several improved breeds of cattle and sheep, for the simple reasons that they are not sufficiently numerous and that they are not uniform. In some years there has been a larger proportion of prize-winners than in others, and more of one breed than any other; and whilst it does not follow that the winners of prizes come out better than those which have not been even honoured by the judges, it will, I think, be evident that if breed

comparisons are to be made, they must be based on returns which are uniform in numbers and in all other respects.

I call attention to this by way of protest against deductions being made from the facts which the facts are not calculated to teach. If the whole of the cattle and sheep exhibited each year were slaughtered, and a record of each obtained, the matter would be different.

CATTLE.

Age and Live-weight.—The ages and weights being published by the Smithfield Club at the commencement of the show, I have simply to take them as they stand. After the expiration of the show, animals may be slaughtered directly or kept for weeks, according to circumstances. When the weather is bad, very fat beasts are a great anxiety to their purchasers, and more carcasses are spoiled than many might imagine. They go green at the bone, and rapidly putrefy without ever losing the animal heat at all. The temperament of the individual has something to do with this occasionally, as also a fevered condition of the blood and flesh from being taken from show to show, some of them going through the ordeal of public exhibition four times, or even more. In such cases there is often considerable waste of the carcass-weight, the kidney suet being presumably the first thing to go, whilst the internal loose fat (the caul or web) not only decreases, but often becomes oily, of a pink colour, and unfit for sale as suet.

It is evident, therefore, that there is more or less increase in the ages, and more or less decrease in the live-weights, from the date of the opening of the Smithfield Club Show until the time of slaughtering, which cannot, as a general rule, be ascertained, and with which, therefore, I cannot attempt to deal.

It has been suggested that a percentage should be taken off the live-weights before calculating the percentage of net to gross weight; but whilst this would be the correct thing to do in the ordinary course of trade—where animals are weighed with or without fasting before leaving home, or weighed at market—it would not add to the value of my returns. When a matter is not practically ascertainable, it is of no use guessing at it. If I were to adopt a certain discount, there would be plenty to come forward and declare it too much or too little, so that the nearest approach to absolute accuracy (that I can give) is clearly attained by the course I have followed.

Daily Gain in Weight.—The average daily gain of show animals from birth is not a matter with which I propose to deal in this connection other than incidentally. The ages and the live-weights are made public property at the commencement of the

Smithfield Club Show, and the average daily gain of live-weight of the prize-winners is published in most of the agricultural papers before any carcass-weights are known. But it will be legitimate to mention that I was the first to begin this part of the work—in this country—having prepared a complete statement of the ages in days, live-weight in lb., and average daily gain in lb. from birth, of all the cattle exhibited at the Smithfield Club Show in 1879 (which the late Mr John Chalmers Morton publicly stated was, in his opinion, a great benefit to breeders), and also of both cattle and sheep, for some years afterwards.

Percentage of Dead-weight.—The carcass-weights being the facts which have been brought to light solely through my agency, I propose to deal only with them and their relationship to live-weights, together with some deductions which, I think, may fairly be made from the evidence.

As already stated, the returns obtained each year vary so greatly in respect of their component parts that a summary of the percentages of net to gross weights would be misleading rather than otherwise. The record, taken as one of details, I believe to be of great value, but if worked into averages it might lose part of this value, or even become actually misleading if used to compare one year's returns with another, or the record of one breed with that of any other.

Age and Increase of Dead-weight.—It is certain, however, that the weight of the carcass increases in proportion to that of the live-weight as the animals grow older, and until the time they attain their full natural development of bone and lean flesh. After that there may be an increase for another year, but it is not of a nature to be useful for any purpose other than that of prize-taking.

The steers under two years old commonly weigh over 800 lb. of dressed carcase. From the last Smithfield Club Show there were six Aberdeen-Angus steers which dressed an average of 872 lb., or 109 stones of 8 lb. (which is a big weight for ordinary Scotch bullocks as sent alive to the Metropolitan Market, or to the Central Market as dressed carcasses), and only two of these were barely commended by the judges; whilst a reserved and highly commended Sussex steer, not twenty-two months old, dressed the very extraordinary weight of 1052 lb., or 131½ stone of 8 lb.

But no two-year-old steer which I have ever seen cut up has given me the idea that it had attained its complete natural and possible development of lean flesh. The lean meat is certainly thicker at from thirty to thirty-six months old. The experience of every butcher I have ever spoken to on the subject has been to the same effect.

Baby Beef v. Early Matured Beef.—"Baby beef" is rubbish; but early matured beef is what all breeders are trying to produce, and what the Smithfield Club itself was instituted to encourage. There is a vast difference between the two, and I am very strongly of opinion that from thirty to thirty-six months is the time in which pure-bred shorthorns, Herefords, Devons, Sussex, Aberdeen-Angus, and Scotch cross-bred cattle can be made, under generous treatment, to yield their maximum economic results.

Under the forcing which show animals get, they make great live-weights and great carcass-weights for age, but they do not put on the greatest amount of lean flesh until the demands of their natural growth have been satisfied; and, so far as I have been able to observe, they do not increase it afterwards.

Refinement in Breeding and Carcass-weight.—Another thing which has impressed me is the fact that refinement in breeding tends to decrease size and weight, and therefore to increase the proportion of fat: a great weight for age is made up quickly, and not only in addition to the lean meat, but also, to a serious extent, in lieu of it. By "refinement" in breeding I mean working for neatness and style, by which size and substance are lost. The framework on which lean meat is grown is reduced in scale, bone fined down below nature's gauge, and hides made thinner.

Over-feeding—With regard to the bearing of this on the exhibition of fat stock at the Smithfield Club Show, and at other similar meetings, I have noticed that show cattle cannot stand the same amount of training which they could do some years ago, and I, for one, am gratified at this result. They do not need the long training, and if prize-winning owners are gainers thereby, the Society and all others concerned are losers. A few rich men buy up promising prize-winners, and continue to stuff them with the hope that they may win prizes another year. No one can blame them for doing this so long as prizes continue to be offered for over-aged animals; but it does no good. I do not wish to be misunderstood about this matter. Professional feeders are of service to breeders undoubtedly; it is the prize schedule which, I think, is at fault. There should be no classes for oxen over three years old in respect of any of the breeds I have mentioned. The breeder and feeder can bring them to their best within that time, and all that is done afterwards represents mere waste of time and money. But there might be a class for oxen of any breed not exceeding four years old (other than Highland, Galloway, and Welsh) not eligible to compete for breed cups or champion prizes.

The beef of the Highland, Galloway, and Welsh oxen, slowly grown, fully matured, and not encumbered with superfluous fat,

is not approachable by any other; the great thickness of finely-grained and finely-marbled lean flesh on the most valuable parts is not obtainable at an early age, or from any other class of beast that I know anything about.

An Official Block-Test.—The Smithfield Club Show, and other fat stock shows of similar character, are as much breeders' shows as are those held by the Royal, Highland and Agricultural, and other great societies in summer; and the highest credit a breeder can obtain is, theoretically, the production of the best carcass of meat in the shortest time. To make this practically so, there should be some provision for the actual test of the block, as at Chicago. In such case, it would be clearly seen—if the numbers slaughtered were fairly representative—at what age the best results are obtained. I venture to think that classes for two years, two and a half years, and three years old cattle (other than of the three breeds referred to as exceptions) would suffice, and be of far greater utility than those now existing in the schedule.

Slow v. Rapid Fattening.—The very severe training which young cattle have to undergo from birth in order to make the best "form" and the greatest weights at or under two years old cannot, as a rule, be followed up for another year; and, as I have already stated, it tends to produce too much fat in proportion to the lean, and to the production of fat at the expense of the lean flesh, which is permeated with it in blocks and layers. It seems to me that the slower feeding, which would bring the animal out at its complete growth at three years old, would be most likely to win the breed cups and champion plates, and to make the best carcasses for the butcher, and for the consumer as well.

I have an idea, therefore, that the feeding of show cattle will effectually resolve itself into training for one exhibition season only; that is to say, feeding from the first with the object of showing at two years old, or at three years old—just as a rifleman adjusts his "sight" for a 500-yard range or a 1000-yard range.

If the plan forces itself upon exhibitors (as I think it will do before long, when the schedule is revised), the slaughter-test would be more easily applicable, because fewer of the animals would be eligible to be shown a second time. Public opinion seems to be about ripe for the addition of the slaughter-test to the Smithfield Club programme; and as there is a building outside the Agricultural Hall, but on the premises, which is in every way appropriate for the exhibition of dressed carcasses, I hope it will not be long before the Committee of the Club can see their way to its utilisation for that purpose.

Percentages of Carcass.—The following statement shows the highest percentages of dressed carcasses to live-weight in

each of the classes for cattle and for sheep at the Smithfield Club Shows since that of 1888 inclusive:—

HIGHEST PERCENTAGES OF NET TO GROSS WEIGHTS—DEAD TO LIVE WEIGHTS—RECORDED FROM THE SMITHFIELD CLUB SHOW, 1888 TO 1892 INCLUSIVE.

CATTLE.

1888.

Steers not exceeding two years old	70.96	Hugh Gorrings's shorthorn.
" " three "	74.59	Wm. Currie's cross-bred.
Oxen " four "	73.47	Sir John Swinburne's cross-bred (<i>second prize</i>).
" above four "	69.45	James Craig's Highland.
Heifers not exceeding four "	71.61	David Bromilaw's shorthorn (<i>commended</i>).
Cows above four years old having had at least one live calf	65.90	Roland Wood's shorthorn (<i>third prize</i>).

1889.

Steers not exceeding two years old	67.01	Miss Morrison Duncan's Aberdeen-Angus.
" " three "	73.20	Wm. Stewart Forster's Sussex (<i>first, and breed cup</i>).
Oxen " four "	76.52	S. W. & S. Utting's shorthorn (<i>third prize</i>).
" above four "	62.45	J. Cairns's Highland.
Heifers not exceeding four "	69.68	J. G. Covell's cross-bred (<i>third prize</i>).
Cows above four years old having had at least one live calf	65.35	D. D. Porteous's Aberdeen-Angus.

1890.

Steers not exceeding two years old	67.04	Clement Stephenson's Aberdeen-Angus (<i>first prize</i>).
" " three "	71.86	J. Criddle's shorthorn (<i>best ox or steer, and reserve for best shorthorn</i>).
Oxen " four "	73.72	H. P. Green's red polled (<i>breed cup</i>).
Heifers " four "	72.56	J. Criddle's cross-bred (<i>breed cup</i>).
Cows above four years old having had at least one live calf	72.43	The Earl of Coventry's Hereford (<i>first, and reserve for breed cup</i>).

1891.

Steers not exceeding two years old	68.51	W. H. Cooke's Hereford (<i>commended</i>).
" " three "	72.19	J. T. Baker's shorthorn.
Oxen " four "	69.85	W. H. Cooke's Hereford (<i>first, and reserve for breed cup</i>).
Heifers " three "	71.84	Her Majesty's shorthorn (<i>best cow or heifer, and reserve for breed cup</i>).
Cows above three and not exceeding six years old having had at least one live calf	67.20	J. B. Green's shorthorn (<i>first prize</i>).

1892.

Steers not exceeding two years old	67.03	Joseph Godman's Sussex (<i>third prize</i>).
" " three "	72.00	George Bruce's cross-bred (<i>second prize</i>).
Oxen " four "	74.50	R. P. Attenborough's cross-bred.
Heifers " three "	75.94	J. J. Colman's Hereford (<i>first, and reserve for breed cup</i>).
Cows above three years old having had at least one live calf	66.24	C. B. Godman's Sussex (<i>third prize</i>).
Heifers or cows not exceeding five years old, not qualified to compete in foregoing classes	69.19	W. P. Radcliffe's Dexter.

SHEEP.

1888.

Wether lambs under twelve months old	64.36	{ Wm. Toop's Southdowns (<i>champion plate</i>).
Wethers under twenty-four months old	71.29	{ The Prince of Wales's Southdowns (<i>reserve and highly commended</i>).

1889.

Wether lambs under twelve months old	64.89	P. Saillard's Southdowns (<i>commended</i>).
Wethers under twenty-four months old	70.61	E. Ellis's Southdowns (<i>fourth prize</i>).
Ewes above three years old	67.36	Wm. Roe's Lincolns (<i>second prize</i>).

1890.

Wether lambs under twelve months old	66.67	James Toop's cross-bred (<i>second prize</i>).
Wethers under twenty-four months old	74.91	{ The Marquis of Bristol's Suffolks (<i>first prize</i>).
Ewes above three years old	69.86	Wm. Roe's Lincolns (<i>first prize</i>).

1891.

Wether lambs under twelve months old	63.71	{ Russell Swanwick's Cotswolds (<i>breed cup</i>).
Wethers under twenty-four months old	76.36	Wm. Toop's Southdowns (<i>second prize</i>).
Ewes above three years old	74.56	Baron Rothschild's Oxfords (<i>first prize</i>).

1892.

Wether lambs under twelve months old	68.34	T. R. Hulbert's Cotswolds (<i>reserved</i>).
Wethers under twenty-four months old	73.29	{ Duke of Marlborough's Exors., cross-bred (<i>commended</i>).
Ewes above three years old	71.06	John Pears's Lincolns (<i>second prize</i>).

Percentages of 1892.—I do not propose to comment on the details, other than those referring to the last show.

The percentage of carcass to live-weight shown by Mr J. J. Colman's Hereford heifer, which was first and reserve for Breed Cup, and winner of other prizes elsewhere, was 75.94—the highest save one on the record—namely, that of 76.52 made by the carcass of Messrs S. W. & S. Utting's shorthorn ox, the winner of a third prize in the Show of 1889. I saw the carcass of the heifer: it was very bright, and what lean meat there was looked to be of excellent quality, but there was very little of it, and the lightness of offals (hide, 51 lb.; loose fat, 64 lb.) helped to make the carcass percentage a high one; whilst the age of this animal was only 21½ months.

Mr R. P. Attenborough's unnoticed cross-bred ox dressed 74.50 per cent of carcass to live-weight, and his offals were fairly heavy, the hide weighing 128 lb. and the loose fat 92 lb. This was supposed to have been an Aberdeen-shorthorn cross.

The heaviest beast in the show alive was Baron Ferdinand

de Rothschild's red shorthorn ox Woodstock, winner of second prize, which weighed 2456 lb. at the commencement of the show, and dressed 1596 lb. to the carcass, which was 64.98 per cent net to gross. The heaviest dressed carcass of which I had any return was 1660 lb. (207½ stones of 8 lb.), from 2383 lb. live-weight, or 69.66 per cent net to gross, made by Mr J. B. Green's second-prize cross-bred ox; supposed shorthorn-Aberdeen. The weight of hide I did not obtain, but that of loose fat was given as 184 lb.—the heaviest weight of any recorded; and I should imagine this to have included the best of the strippings as well as the caul.

The champion cross-bred ox, exhibited by Sir John Swinburne, Bart., weighed 2276 lb. alive, and his dressed carcass weighed 1599 lb. (1 lb. short of 200 stones of 8 lb.), or 70.25 per cent net to gross. I do not know what the offals weighed.

I was fortunate to obtain the carcass-weights of the three foremost winners of the year—namely, the champion already referred to, the Elkington and Thorley Cup winner at Birmingham, and the champion at Norwich. Mr Robert Copland's cross-bred heifer Queen of Hearts, an Aberdeen-Angus with a remote cross of shorthorn blood, was second animal at Islington as well as being first at Birmingham. She weighed 1846 lb. alive, and her dressed carcass weighed 1292 lb., or 69.98 per cent net to gross, offals not being given.

Mr J. J. Colman's Norwich champion shorthorn-red polled cross-bred ox, second at Islington, weighed 2032 lb. alive, and dressed 1384 lb., or 68.11 per cent net to gross, the hide weighing 96 lb. and the loose fat 112 lb.

I have singled out these details because they refer to the most prominent animals of the year, and because they help me to point a moral. But there is one other animal to which I must direct especial attention—namely, Mr H. T. West's Sussex steer, which took reserve and a high commendation in its class. At just under 22 months old this steer weighed 1636 lb. alive, and dressed 1052 lb. of carcass, showing 64.30 per cent net to gross, the hide weighing 88 lb. and the loose fat 140 lb. This animal is noteworthy as having made the highest live-weight of any animal in the show under two years old, and also as having dressed the heaviest carcass within that category. It was not sold at Islington, but at a local auction close to where it was bred for £36, 10s. This information did not reach me until after special inquiry, and when it was too late for me to see the carcass, which I particularly wished to do. The offals were considerably larger than I had reckoned upon.

Lessons from the Inquiry.—I think these details, which happily serve my purpose, will suffice as typical cases to justify me in coming to the broad conclusion—the whole of the testi-

mony supporting it—that the one object-lesson taught by the inquiry under notice is to the effect that breeders and feeders should make up their minds to sell at home, if possible, and, under all circumstances, at so much per lb. of live-weight. They can do it if they choose. I take it for granted that, however strong the opposition may be, there is now no disinclination on the part of sellers to adopt the system of selling by live-weight if it were made practicable to them, both in respect of home sales and sales at market.

That being so, the next question arises as to the basis of value to be calculated on sales of animals by live-weight; and I do not hesitate to say that the records published in connection with this inquiry go to show that it should be that of the live-weight rather than that of the estimated percentage of the net dressed-weight to that of the gross live-weight. My reasons for thinking so are, that it would give the seller an opportunity to bring into his own service the special knowledge he must have in respect of the breeding and feeding of the animals—the temperament of individuals, and the nature of the food supplied, &c.—which the buyer cannot possess, other than in exceptional cases; and that it would be far more simple to learn. The breeder or feeder (the seller) needs to be paid for all he produces in the shape of living animals, just as he is paid for all he produces in the shape of grain or other farm produce. Why he should persist in selling on the basis of guessing at the percentage of carcass which an animal will produce when slaughtered, whether he knows the live-weight or not, is to me incomprehensible—if he can avoid it.

I do not wish to draw any special inference from any one particular case, but the few I have cited will show how greatly the weight of such offals as hides and loose fat tend to determine the percentage of net carcass to gross live-weight, and how seldom such knowledge is obtainable. In fact, the seller professes to give away the great unknown "fifth quarter" in bargaining for the equally "unknown quantity" of the dressed carcass; and anything so absurd within the entire scope of the world's commerce has never yet come under my notice.

I have no personal knowledge of the American trade, but I believe that the entire business in the Chicago stock-yards—the largest live-stock market in the world—is conducted solely on the basis of live-weight, and that values per 100 lb. are reckoned to fractions of cents. Why, therefore, could not we do the same? Because we have not, as yet, similar appliances and similar ideas. At the present time the jobber, and the dealer, and the butcher conspire together to flatter the breeder and grazier into the idea that he is altogether too good a judge of his own business to need the aid of a weighing machine, and

this flattery goes a long way. But if the breeder and the grazier were to insist on the sale of these live-stock produce by live-weight, more than a moiety of the dealing trade—which is undoubtedly the greatest curse to the British live-stock industry, and the most prolific source of the dissemination of contagious diseases—would be scotched, if not killed, to the great benefit of the country. Of course, fairs are necessary, but there is now a provision by which buyers or sellers may claim to transact business in all the more important marts on the basis of live-weight.

Briefly, therefore, I take it that the sellers of live-stock, if they are in a position to sell by live-weight, should have a most decided advantage over buyers, if they will devote their intellects to the problem of selling living animals by live-weight, whether in fat or in store condition. In the case of fat animals, they should know more about the "fifth quarter" than the butcher can do whilst the animals are living; and in the case of store stock, the breeder should know at least something more than the buyer.

With regard to "crosses" which gained so much distinction at the last show, I may mention the fact that Messrs Slater & Cook, of Jermyn Street, when showing me the carcasses of the Earl of Coventry's Hereford-Highland cross, remarked that it was one which might be looked after with advantage. The champion cross-bred I saw in quarters at Mr Grant's, King William Street, Charing Cross. It had a great thickness of lean flesh all along the top, but was wastefully fat elsewhere. The flesh along the top had not the fat of an ordinary Christmas' beast upon it, and was of grand quality. I put this down to the Galloway blood. For the rest I have nothing special to remark.

SHEEP.

With regard to sheep, I may safely say that the Down breeds are now got very nearly to maturity, so far as the development of lean flesh is concerned—which is my objective point all through—in the showyard within twelve months from birth.

These animals represent the "tegs" or "hoggets," which would come to market in the ordinary way at from fourteen to sixteen months old, and which are the most everyday saleable of all mutton. The mountain and other wethers, which are not forced at first, do not come within the category.

The Blackfaced Scotch wethers which come to the Smithfield Club Show are always keenly competed for by the London butchers who cater for the West End clubs, hotels, and private families. These—like the Highland cattle—have a texture of

lean meat, and a flavour which cannot be obtained off their native hills, and such mutton in London is scarce.

The Smithfield Club has done wisely to put a fresh class into their schedule for "wether sheep above twelve and under twenty-four months old, first cross from Cheviot, Scotch, and mountain breeds," inasmuch as these crossed and mixed-bred sheep are just such as make the best mutton of cominence in the north.

BUTCHER-JUDGES.

I have nothing more to say which could fairly be classed as a deduction from the results of the inquiry; but I may venture to suggest that the time has fully come for leading butchers and salesmen to be included amongst the judges at our fat stock shows. No one can recognise more clearly than they do that the Smithfield Club Show is not on all-fours with the Metropolitan Market, and the introduction of this fresh element could scarcely prove other than beneficial. If, in the case of two judges, one selected from the classes named would be considered too strong an infusion of leaven, an umpire chosen from amongst them would be better than none.

BRITISH FARMING AND FOREIGN COMPETITION.

By Professor JOHN SCOTT.

AGRICULTURE, every one admits, is passing through a period of unusually prolonged trade depression, in which there has been much loss, not a little absolute ruin, and widespread discontent. As to the real extent, nature, and causes of this depression, there is no unanimous opinion, further than that the most obvious and proximate cause is low prices for agricultural produce of all kinds, with its unhealthy attendants, loss of capital, and want of sufficient profit. But then, few people will be found to agree as to what is sufficient profit; and as there are farmers who make money at present prices, it might be difficult to prove that prices are really too low. Commodities can only be said to be sold too cheap when they are sold at a loss, and selling at a loss is a self-adjusting process, which very soon rights itself. Farming is readjusting itself, or being readjusted, to new conditions; and he must be a bold man who ventures on a full explanation just now, either of all the causes which

have conspired to render this readjustment necessary, or of the various methods of readjustment best suited to the varied conditions under which farming in this country has to be carried on.

It is so easy to dogmatise on a subject of this kind, that the most useful way to treat it is, perhaps, simply to demonstrate facts as they are, and leave their interpretation to the reader. Even merely to demonstrate the subject in all its bearings is far more than can be promised in an article of this short length; but let us investigate a little.

A list of all the alleged causes of this so-called agricultural depression might prove more curious than interesting reading. Only seven of them, however, seem to merit attention here. These seven are—

Bad seasons.	High rents.
Fall of prices.	Unjust taxation.
Over-production.	Increased cost of produc-
Foreign competition.	tion.

The first scarcely admits of demonstration, because the climate of the British Islands is never uniform; and when the season is unpropitious in one part of the kingdom, it is often very propitious in other parts. Still, the weather is not a subject to be altogether neglected by farmers, and it may be well to keep it on the short list.

BAD SEASONS.

It is contended that the climate of the British Islands is deteriorating, and that it is less favourable for agriculture than it was a few years ago. Dr Buchan's meteorological report bears out this contention to some extent, for it shows that during the last twenty years there has been a continued spell of temperature below the average; and there is no doubt that cold summers have had a prejudicial effect on agriculture during that period, while the situation has been aggravated by several wet harvests. The good harvests of the last twenty years, indeed, might be counted on the fingers of one hand; and two harvests out of the twenty—viz., those of 1879 and 1892—are allowed to have been the worst within the memory of the present generation.

Cold summers and wet seasons are also chargeable with a higher death-rate amongst live stock, and with special losses by disease, such as the eight millions of sheep destroyed by liver-fluke during the wet seasons immediately preceding 1882.

Exceptional losses, like the last-mentioned, cannot always be

insured against, but average losses can. We know what the British climate is—that it is a fickle one at the best; and that bad seasons and wet harvests are amongst the things that farming in this country always has had to contend with. For such risks farmers have the remedy in their own hands. As a mere matter of business, they are bound to make their reckonings on an average of seasons, and so as to cover all ordinary risks and losses both of crops and live stock. Where this has not been done, it will avail little to grumble about the weather.

FALL OF PRICES.

The collapse of prices began in 1875, and wheat may be said to have been falling ever since; but, excluding grain and wool and potatoes, prices were higher in 1882 than in 1872. It is only since 1883, however, that wheat has sunk to its present low level; and as since then the fall of prices has affected other articles besides grain and wool and potatoes, it follows that the last eight years have been more disastrous to farmers than the eight years immediately preceding 1883.

		PRICE.			RATIO.		
		1872.	1882.	1892.	1872.	1882.	1892.
Wheat,	pence per bushel	84	68	42	100	80	50
Barley,	" "	56	48	40	100	85	72
Oats,	" "	36	23	28	100	91	77
Hay,	shillings per ton .	100	90	80	100	90	80
Straw,	" "	60	50	40	100	83	66
Potatoes,	" "	80	78	55	100	97	68
Flax,	shillings per cwt.	65	60	55	100	92	84
Hops,	" "	85	94	104	100	110	122
Horses,	£ per head . .	30	32	30	100	106	100
Yearling cattle,	shillings per head	210	230	130	100	109	62
Two-year-old cattle,	" "	290	330	210	100	113	72
Lambs, ¹	" "	19	19/6	9	100	102	47
Draft ewes, ¹	" "	36	42	15	100	116	42
Wool, ¹	pence per head .	21	11	9½	100	52	48
Beef,	shillings per cwt.	48	53	46	100	110	96
Mutton,	" "	52	58	48	100	111	92
Pork,	" "	50	55	47	100	110	94
Milk,	pence per gallon .	7	8	9	100	114	128
Butter,	shillings per cwt.	110	114	112	100	103	101
Cheese,	" "	55	57	56	100	103	101
Eggs,	pence per 120 .	76	86	96	100	112	126

¹ The prices of lambs, draft ewes, and wool are based on the returns from a Cheviot flock.

In the foregoing table of prices we see at a glance that wheat has fallen 50 per cent since 1872, wool 55 per cent, and beef 4 per cent, while milk has risen 28 per cent; yet the agricultural revenue of the United Kingdom in 1892 was only 15 per cent less than in 1872. The explanation is to be found in the relative importance of the different products, and in the fact that the articles which have been least affected by the fall of prices are the only ones whose production has been expanding. Thus beef and milk are each of them three times as important as wheat, and six times as important as wool. A rise or fall in wheat or wool, therefore, has but a trifling effect on the country compared with one in beef or milk, although at first sight the four items may seem of nearly equal importance.

Of course, where wheat has continued to be one of the principal crops, the fall of price has not been less disastrous to its producers because of its minor importance in the national production. An acre of wheat, which was worth £10, 12s. 6d. in 1872, was last year worth only £5, 7s. 6d. But wheat-land can be turned to account in a dozen different ways; and wheat-land farmers have only themselves to blame if they have continued to grow it at a loss.

The farmers who are at the present time suffering most are the occupiers of hill-grazings, whose only products are lambs, draft ewes, and wool, and which are not adapted for producing anything else. Notwithstanding the low price of wool, the scarcity of sheep stock caused sheep-farming to be fairly remunerative from 1882 to 1890; but since the latter year lambs and draft ewes have fallen about 55 per cent in value, and it seems as if store-stock farmers were now in greater difficulties than grain-farmers.

It is in favour of store-farmers, however, that rent is the principal item of expense with them, and that it is easier for them than for any other class of farmers to readjust the costs of production; but those of them who entered to their farms when sheep stock was at a high price, and perhaps paid a fancy valuation price for it, must now view with something like blank despair the total disappearance of one-half or more of their capital.

PRODUCTION AND CONSUMPTION.

In every branch of farming, except grain-growing, the produce of the United Kingdom is much greater now than it was twenty years ago. We grow more cattle-food, and keep more cattle, sheep, and horses, and produce more beef and mutton, more

milk and butter and cheese, and more wool. Absolutely such is the case; and it rather lends support to the talk about over-production. But then all these products go to feed the British people; and, relatively to population, the agricultural production of this country is much less than it was in 1872. Twenty years ago the population of the United Kingdom was only 31,929,000; now it is 38,188,000. The increase of people has been so great that the ratio of all agricultural production has sensibly declined.

Even the live stock of the farm has relatively decreased in numbers, although we have 50 million head now as against 48 millions in 1872. In that year we had 31 cattle, 103 sheep, 11.5 pigs, and 5.9 horses for every 100 inhabitants, which numbers, compared with those for 1892, show that there has been a relative decline of about 15 per cent.

	British Live Stock		Per 100 Inhabitants.	
	1872.	1892.	1872	1892
	No.	No.	No.	No.
Cattle . . .	9,932,000	11,519,000	31	30
Sheep . . .	33,192,000	33,642,000	103	88
Pigs . . .	3,782,000	3,265,000	11.5	8.4
Horses . . .	1,820,000	2,094,000	5.9	5.4
	48,726,000	50,520,000	151.4	131.8

The meat product of British live stock has also relatively declined; but the percentage of decline is less than that of the number of animals, mainly owing to the earlier age at which animals of all kinds are now brought to the shambles.

	British Meat Production		Lb. per Inhabitant.	
	1872.	1892	1872	1892.
	Tons.	Tons.	lb	lb.
Beef . . .	665,000	786,000	46.6	46.2
Mutton . . .	414,000	419,000	29.0	24.6
Pork . . .	264,000	227,000	15.4	9.9
	1,343,000	1,432,000	91.0	80.7

In dairy produce the ratio of production shows more favourably. Not only is there an absolute increase, but there is a relative increase to population as well, in all the three branches of milk, butter, and cheese. This increase is partly explained by the fact that more cows are kept now than in 1872; but

that is not all. The milk-yield per cow has been considerably increased by improved attention to dairying and calves are now reared more on milk substitutes. Altogether the yield of dairy produce is about a third greater than in 1872; yet in this branch of farming even, as will be seen presently, the increase of production does not keep pace with the increase of consumption:—

	British Dairy Produce.		Lb. per Inhabitant.	
	1872.	1892.	1872.	1892.
	Tons.	Tons.	lb.	lb.
Milk . . .	3,120,000	4,460,000	219.0	262.0
Butter . . .	96,000	159,000	6.7	9.3
Cheese . . .	120,000	180,000	8.4	10.5
	3,336,000	4,799,000	234.1	281.8

Field products, with the exception of grass and hay, are all relatively as well as absolutely less. The area under corn has diminished 2,033,000 acres, or 18 per cent. Permanent pasture has increased 1,958,000, or 7 per cent; while rotation grasses have increased 724,000 acres, or 13 per cent of the cultivated land, though the whole area under rotation is less by 10 per cent; and the actual ratio of tillage is now only 52 acres per 100 inhabitants, as against 69 acres in 1872:—

	British Crop.				Per Inhabitant.	
	1872.	1892.	1872.	1892.	1872.	1892.
	Million acres.		Million bushels.		Bushels.	
Wheat . . .	3.7	2.2	113.1	68.9	3.5	1.9
Barley . . .	2.5	2.2	93.7	79.9	2.9	2.1
Oats . . .	4.2	4.2	169.3	169.5	5.3	5.2
Beans and peas .	0.9	0.5	27.2	15.9	0.8	0.5
	11.3	9.1	403.3	334.2	12.5	9.7
					Per head of Live Stock.	
	Million acres.		Million tons.		cwt.	cwt.
Straw . . .	11.3	9.1	17.0	14.2	7.0	5.8
Hay . . .	7.8	8.7	15.6	17.5	6.3	7.2
Potatoes . . .	1.5	1.2	9.0	7.6	3.7	3.0
Turnips . . .	2.4	2.2	39.6	35.9	16.3	14.6
Other green crops	1.0	0.9	16.0	15.1	6.6	6.3
Rotation grasses	5.2	5.9				
Permanent grass	26.5	27.5				
Hill-grazings .	15.0	15.0				

The home production of wheat is now only 1.9 bushel per inhabitant, against 3.5 bushels twenty years ago. But the statistics of hay and straw and green crops, in relation to head of live stock, brings out another important fact. They show that diminished production of winter food was one of the actual and visible causes of the serious fall in the prices of sheep and cattle last autumn.

Clearly there is no ground for the contention that British agriculture is suffering from over-production.

This relative decline of agricultural production would be intelligible if there was any falling off in the consumption per head of population. But the very reverse is the case. For all products of the farm there is a very marked increase in the average annual consumption per inhabitant, compared with twenty years ago. On five of the principal articles the increase of consumption shows as follows:—

	Total consumption in the United Kingdom.		Lb. per inhabitant.	
	1872.	1892.	1872.	1892.
	Thousand tons.		lb.	lb.
Wheat	5236	6280	366	368
Meat	1590	2085	111	122
Butter	162	268	11	15
Cheese	180	291	12	17
Wool	147	219	10	12

Every inhabitant of these islands now consumes annually 11 lb. more meat, 5 lb. more cheese, 4 lb. more butter, 2 lb. more wheat, 2 lb. more wool, and more of every other agricultural product than twenty years ago. In other words, our present population of 38 millions last year consumed 186,000 tons more meat, 84,000 tons more cheese, 68,000 tons more butter, 34,000 tons more wheat, 34,000 tons more wool, &c., than the same number of people would have consumed in 1872.

This alone would have enabled the home market to take a great deal more of all kinds of farm produce than it was taking in 1872; but it had another additional want to satisfy as well. The natural increase of population averaged 310,000 a-year between 1872 and 1892; and at the present average consumption this meant an additional demand for 50,900 tons more wheat, 15,500 tons more meat, 2071 tons more butter, 2350 tons more cheese, 1660 tons more wool, &c., every year.

Assuming, then, that we have reached the maximum of consumption per individual, which is perhaps an unwarrantable

assumption, there is still an ever-increasing population to feed. The increase of population in the last ten years was only 236,000 a-year, which is considerably below the average increase for the twenty years; but even the lower rate of increase will make a large additional demand on the food-supply. If we require 50,000 tons more wheat, 15,000 tons more meat, &c., this year than we did last, ten years hence we shall require 500,000 tons more wheat, 150,000 tons more meat, &c., every year than we do now.

FOREIGN COMPETITION.

The ever-increasing demand in the home market for all kinds of agricultural produce is a standing stimulus to British agriculture. It would be so if the home production was, for the time being, equal to the requirements; how much more, then, when the country is dependent on foreign and colonial supplies for fully a third of all the farm produce it consumes? The extent of this indebtedness will be seen from the table (p. 120) of national expenditure on articles of this class during the year ended 31st December 1892.

Dr Livingstone's men, on being told that the Portuguese traders imported corn, cried out, "Are they ignorant of tillage? They know nothing but buying and selling; they are not men!" It might be instructive to hear a dusky Africander comment on the various items which make up our last year's imports.

The little bill of £140,700,000 for imported agricultural produce is remarkable for more than its amount. It shows, amongst other things, that not a single article of British farm produce is now entirely free from foreign competition in the home markets. The perishable article milk, and bulky but comparatively cheap articles like hay and straw, are to some extent naturally protected in favour of our own farmers, but only partially; for whenever the price of any one of them gets relatively much higher than that of other articles, foreign and colonial producers step in and level down the profits.

But, after all, corn and meat constitute the staff of life. If all our farmers devoted themselves chiefly to the production of milk and hay, and such things, we might soon have over-production in these articles, and a dearth of bread and meat. The surest way to prevent a glut of any article is to give attention to all. And the diversity of soil and climate and local wants in this tight little island ought to make the variety in the bill of national consumption the safety-valve that will enable British farming to be carried on at a pressure high enough to keep all outside competition at a harmless level.

The increasing proportion of imported agricultural produce in

	Million £ sterling.		
	Home-grown.	Imported. ¹	Total consumption
Wheat	12.3	37.1	49.4
Barley	13.9	4.3	18.2
Oats	19.7	5.0	24.7
Beans and peas	2.8	2.0	4.8
Maize . . . . .	...	9.5	9.5
	48.7	57.9	106.6
Beef	36.1	15.3	51.4
Mutton	20.1	3.7	23.8
Pork, bacon, and hams	10.6	11.5	22.1
	66.8	30.5 ²	97.3
Milk	37.5	0.9	38.4
Butter	17.8	11.9	29.7
Cheese	10.0	5.4	15.4
Margarine . . . . .	...	3.7	3.7
	65.3	21.9	87.2
Poultry and eggs	3.5	4.6	8.1
Wool	6.2	9.4	15.6
Horses	5.0	0.4	5.4
Hay	35.0	0.6	35.6
Straw	5.0	0.1	5.1
Moss litter . . . . .	...	0.7	0.7
Potatoes	15.8	1.0	16.8
Green crops	6.5	2.5	9.0
Clover and grass seeds . . . . .	...	0.6	0.6
Fruit and vegetables	6.5	3.5	10.0
Flax and linseed	0.9	3.7	4.6
Hemp . . . . .	...	2.4	2.4
Hops	2.7	0.9	3.6
	87.1	30.4	117.5
Total	267.9	140.7	408.6
Percentage	66	34	100

¹ With the exception of the article horses, the figures in this column give the net value of imports, after deducting the value of exports. Against the 21,026 horses, value £425,336, or £20 a-head, imported last year, we exported 11,232 horses, value £563,181, or £50 a-head.

² The proportions of dead meat and live animals imported were—

Dead	21.5
Alive	9.0

30.5

British markets is disquieting in more senses than one. In 1868 it was only 15 per cent of the whole. Ten years later it had risen to 20 per cent. Now 34 per cent, or more than a third of all our requirements, has to be obtained from abroad. Owing to the fall of prices the rate of this increase cannot be measured by comparing the expenditure on imports in 1892 with that of any previous year; but a view of the comparative quantities of five principal articles shows that the percentage imported is increasing in a higher ratio even than the national consumption.

	Total consumption of the United Kingdom.		Home-grown.		Imported.		Percentage of Imported.	
	1872.	1892.	1872.	1892.	1872.	1892.	1872.	1892.
	Thousand tons.		Thousand tons.		Thousand tons.		Per cent.	
Wheat . . .	5236	6280	3130	1930	2106	4350	40	60
Meat . . .	1590	2085	1343	1432	247 ¹	653 ¹	15.5	31.3
Butter . . .	162	268	96	159	66	109	40.7	40.8
Cheese . . .	180	291	120	180	60	111	33.3	38.1
Wool . . .	147	219	69	71	78	148	53.0	67.5

In regard to the future of this competition, if it were not that it would make the story too long, it might be shown by foreign and colonial statistics of production and consumption that there is nothing in the situation to warrant the slightest hope of any contraction or rise of prices. The world is wide, and much of it already occupied is still producing very little; while the pioneers of agriculture, as well as the railway system, have whole regions yet to penetrate—not only in Africa, and in Asia, and in Australasia, but in Canada, the United States, and South America, and in parts of Europe also. If there were no other competitors, the United States alone, with 500,000 square miles of good land still available for cultivation, could easily raise enough of surplus produce of every kind to supply the wants not only of Great Britain, but of all Europe in addition, for many years to come. The chances are, then, that in the absence of any widespread political disturbance, the opening of new fields, and better facilities of transportation, will bring prices for agricultural products of all kinds to a far lower level than they have yet fallen to. We must make liberal allowance for the shrinking of "the excessive margins of profit which the

¹ Including live cattle, sheep, and pigs, as follows:—

	Cattle.	Sheep.	Pigs.
	No.	No.	No.
1872 . . .	248,611	917,076	85,562
1892 . . .	502,237	79,048	3,826

growth and transportation and merchandising of colonial and American products have hitherto yielded at every stage of the operation."

FOREIGN STORES.

Statistics seem to show that the dead meat trade is surely destroying the trade in live fat cattle. The shipment of dressed meat is indeed the safest and most economical mode of exporting surplus cattle, as probably five times as much meat can be shipped in the same space, and it saves the expense of feeding and care while in transit.

At the same time, the trade in foreign store cattle has been growing for some years, and would evidently assume far larger dimensions but for the restrictions imposed by the Contagious Diseases (Animals) Act. The question of allowing the entry of Canadian and other stores is one of great interest and importance at the present time, and, naturally, it is regarded from two very different points of view.

Farmers whose holdings are better fitted for fattening than for breeding, contend that if Canadian stores are kept out, they will have to pay relatively very high prices for home-bred stores; while the price of fat cattle will be kept down by the importation of dead meat.

On the other hand, home breeders of cattle have strong reasons for insisting on the exclusion of foreign stores. The whole of Europe is infested with cattle disease, and there are few countries outside Europe, Canada not excepted, that can show they are entirely free from it. Time and again British herds and flocks have been decimated by imported diseases, and enormous sacrifices, both of stock and of money, have been demanded of the country as the price of stamping them out; and so long as live cattle are allowed to be landed here from foreign parts, we are liable any day to have a fresh importation of disease.

The shutting out of Canadian or other stores would not affect the food-supply of this country in the least. These cattle are bound to come here any way, as dead meat if not alive; and for the safety of British herds and flocks, which still furnish over two-thirds of all the meat consumed in the United Kingdom, it does seem only reasonable that all foreign animals sent here for food should be slaughtered at the port, or, better still, imported only in the form of dead meat.

We are apt to overlook the fact that Great Britain gets more live animals, both store and fat, from Ireland than from all other countries combined. Last year we got 502,237 cattle, 79,048 sheep, and 3826 pigs from abroad. In the same twelve months there were imported into Great Britain from Ireland

624,503 cattle, 1,082,465 sheep, and 500,951 pigs. We may thus be said to draw from Ireland $\frac{1}{3}$ more cattle, $13\frac{1}{2}$ times more sheep, and 139 times more pigs, than from all other countries put together; and a little calculation will bring out that the annual value of the live-stock imports from Ireland is nearly half the total value of all the foreign meat imported, both dead and alive.

RENTS.

It is not a very hopeful feature of the situation that so many farmers regard a further reduction of rent as their only salvation. This is probably necessary on some estates; but each case needs separate consideration, where it has not received that already. It is impossible to lay down any general rule on the point, since some estates are rented much more highly than others, and some parts of the country have suffered much more than others from the prevailing depression.

It will be granted that if capital and intelligence and industry cannot make farming pay, there is no other resource than a further fall of rent; but it is exactly where these three requisites are all in force that farming does not fail. There are thousands of acres of corn land, in the Midlands of England and elsewhere, which, if rent free, could not grow wheat profitably at its present price, and as they are now farmed; just as there are many sheep farms in Scotland that could not show a profit on last year's management even if they were rent free. This shows that very much more than a readjustment of rents is needed to bring agriculture into harmony with the times.

The land rental of the United Kingdom is now rather less than it was during the years 1851-60, though not so low as from 1841-50, when it was $56\frac{1}{2}$ millions. The rise was gradual till 1880, when rents were at their highest. Since then they have fallen $12\frac{1}{2}$ millions, being a decrease of 20.7 per cent in England, of 18.2 per cent in Scotland, of 0.5 per cent in Ireland, and of 17.7 per cent for the United Kingdom. During the last twelve years the rental increase of the previous twenty years has disappeared.

LAND RENTAL OF THE UNITED KINGDOM.

Year	England.	Scotland.	Ireland.	United Kingdom.
	£	£	£	£
1880 . . .	51,798,950	7,769,303	9,980,543	69,548,796
1890 . . .	41,795,594	6,416,507	9,941,799	58,153,900
1891 . . .	41,378,589	6,374,863	9,941,368	57,694,368
1892 . . .	41,000,000	6,340,000	9,941,000	57,281,000

The table gives the annual valuation of land for income-tax, but Schedule A is at present in excess of the actual rental, as a great many landowners grant abatements of 10 or 20 per cent to their tenants, which may bring the gross rental down to something like £55,000,000. This, again, is subject to landlords' outgoings—taxes and land burdens of every kind, repairs, &c.—which will reduce the net rental to about £40,000,000.

Those who weigh these figures carefully will see that there is not much to be expected from a further reduction of rent. Even at Schedule A valuation, the average rent has fallen rather more than the value of agricultural product, which is more than could have been expected. For natural rent never does fall in exact proportion to the fall in the price of produce. The latter is only one of several elements in calculating rent; and a fall in the price of produce always brings a corresponding fall in the price of feeding-stuffs, manures, seeds, and implements, and in the general costs of working. In the natural course, few things can be more certain than this—that the present fall of rent is only temporary. In a wealthy country like Britain, where the acres are few and population is fast increasing, the general trend of land values will be upwards. Rent will fluctuate from time to time, of course, but low prices in this country can only have one result, and that is, not to cheapen land but to cheapen production.

The rental of Scotland is almost the same now as it was in 1812, when the valuation was £6,108,050. The present rents average, as near as can be, 21s. per acre for arable and improved grass land—varying, however, from 10s. to £5 per acre, according to fertility of soil and neighbourhood to good markets; and 3s. 4d. per acre for rough hill-grazings, with a range of from 9d. to 6s. per acre. As these grazings only carry an average of one sheep to every $1\frac{1}{2}$ acre, it fixes the average sheep rent at 5s., though some of the Highland blackfaced grazings are as low rented as 2s. per sheep, and some of the Cheviot grazings as high as 7s. 6d. per sheep.

These rents, both for improved land and for rough hill-pasture, are strikingly borne out by the rent-book of a well-known estate in one of the Border counties. The estate comprises thirty-seven farms, with a total of 61,980 acres, of which 5070 acres are arable and permanent meadow or improved pasture, and 56,910 acres are rough hill-pasture. The united hill stocks number 37,940 sheep, and the estate rental, which was £13,000 in 1860, and rose to £16,000 in 1880, is now £14,800. If the figures are worked out, it will be seen that the results agree to a penny almost with the averages for the whole of Scotland.

TAXATION AND BURDENS ON LAND.

In the burdens now imposed on land there are certainly circumstances of extreme injustice. Yet it is often said that land, and the incomes derived from it, do not pay their fair share of taxation. Let us see how the matter really stands. The total direct taxation of the United Kingdom last year would be about £63,135,369. The Exchequer receipts amounted to some £94,743,000, but, omitting the receipts from Customs, Excise, Post-office, &c., only £28,866,617 was raised by Imperial taxes directly levied—*i.e.*, from Income-tax, Land-tax, Inhabited House Duty, and Death Duties. Again, the total receipts for purposes of local taxation amounted to £67,180,000, but excluding Tolls, Rents, and similar receipts, as also a sum of £7,383,484 surrendered by the Inland Revenue to the Local Taxation account, the net amount raised from rates was only £34,268,752. The total direct taxation, both for imperial and local purposes, may therefore be taken, approximately, at £63,135,369, distributed as follows:—

IMPERIAL AND LOCAL TAXATION.

	Imperial.		Local.		Total Taxation.	
	£	Per cent.	£	Per cent.	£	Per cent.
England . .	25,063,108	39.6	27,720,125	43.8	52,783,233	83.4
Scotland . .	2,269,489	3.4	3,557,565	5.5	5,827,054	8.9
Ireland . .	1,534,020	2.8	2,991,062	4.9	4,525,082	7.7
United Kingdom	28,866,617	45.8	34,268,752	54.2	63,135,369	100

Of this sixty-three millions, agriculture pays £16,705,178, or 26.5 per cent; and that is not all. There are tithes and teinds, amounting to £4,388,792, borne wholly by land, in addition to the above; so that agriculture pays annually no less a sum than £21,093,970, or 31.0 per cent of the total burdens of the country. But it may be well to specify the special contributions of agriculture, and the amounts paid by owners and occupiers respectively.

[BURDENS.

BURDENS ON LAND.

OCCUPIERS PAY.	England	Scotland.	Ireland.	United Kingdom.
	£	£	£	£
Tithes . . .	3,793,149	...	...	3,793,149
Rates . . .	4,150,000 ¹	700,000	1,050,000	5,900,000
Income-tax . .	209,729	29,202	26,547	265,478
Inhabited House } Duty	5,000	1,000	800	6,800
Total . . .	8,157,878	730,202	1,077,347	9,965,427
OWNERS PAY.				
Tithes and teinds .	256,851	240,000	98,792	595,643
Rates . . .	4,150,000	700,000	1,050,000	5,900,000
Income-tax . . .	1,106,307	119,961	106,632	1,332,900
Land-tax . . .	1,050,000	50,000	...	1,100,000
Duties and stamps	1,600,000	250,000	350,000	2,200,000
Total . . .	8,163,158	1,359,961	1,605,424	11,128,543
Total burdens on } land	16,321,036	2,090,163	2,682,771	21,093,970

The whole of the burdens on land are supposed to fall on the owner in the long-run; but when new taxes are laid on the occupier during the currency of a lease, they often stick there. And the new imposts during the last quarter of a century have practically doubled the rates within that period.

Twenty-five years ago the rates were £36,000,000. Now they are considerably over £67,000,000. The reason why they are so high is clear enough. Only £1 in every £3 of net taxable income in this rich country pays rates. Two hundred millions of annual income from land and houses is saddled with the whole of the local burdens, and four hundred millions of annual income from personality pays nothing. For example, here is a farmer whose land is partly within the suburban area, paying £10 a-year in highway rates; yet he does less damage to the roads in a year than his neighbour who pays nothing towards them does in a month. Another farmer who occupies 1100 acres of arable land is assessed to the poor-rate at one-third more than a neighbouring iron and steel works. The farmer in question employs about 60 hands, and makes a return on some

¹ This assumes that the local rates are equally divided between owner and occupier, as in Scotland and Ireland; but in England, as a rule, the tenant pays more than half of the rates.

£8000 a-year; the factory employs between 700 and 800 hands, and the owner would think he was doing badly if his annual profits were not twice as much as the farmer's whole turn-over. Yet the farmer is rated at a third more than the other! A dozen different illustrations might be given showing the same injustice to the farmer in the present incidence of the rates.

If the whole taxation of the country was paid on income, then, instead of land having to pay 31.0 per cent, as it now does, it would only be called on to pay 12.1 per cent, and of that 10 per cent would fall on the owners and 2.1 per cent on the occupiers. One penny in the £ on the net taxable incomes of the United Kingdom now yields £2,190,655; therefore 2s. 7d. in the £ would yield £67,524,161, or enough to pay all imperial and local taxes, and tithe-rent-charge as well.

AN EQUITABLE READJUSTMENT OF TAXATION.

Taxes and other burdens paid by	According to present incidence of taxation.		If all taxes were paid according to income.	
	£	Per cent.	£	Per cent
Occupiers of land . . .	9,965,427	14.6	1,371,626	2.1
Owners of land . . .	11,128,543	16.4	6,866,650	10.0
Land	21,093,970	31.0	8,238,276	12.1
Other classes	46,430,191	69.0	59,285,885	87.9
Total	67,524,161	100	67,524,161	100

Farmers and landowners, it is seen, are paying £21,093,970 in taxes and tithes, when their proper share is only £8,238,276. In other words, they are paying every year £12,855,694 of taxes which ought to fall upon other classes. No wonder there is agricultural depression! What other industry could bear up against this? The farmers are overtaxed £8,593,161, and the landowners are overtaxed £4,261,873, and yet it is said that land, and the incomes derived from it, do not pay their fair share of taxation!

COST OF PRODUCTION.

Fortunately it is not necessary to say much on this point. Rent and taxes have been dealt with, and it only remains to be seen whether there has been an increase of expenditure in any of the other items which make up the cost of production. These other items are—Labour, seed, purchased manures and

feeding-stuffs, repairs, insurance, depreciation, and interest on capital.

As money is cheaper, and stock and crop and implements have all depreciated in value, it follows that the charges for insurance, depreciation, and interest on capital have also been less. Seed, manures, oilcakes, and other feeding-stuffs are all about a third cheaper than they were twenty years ago.

Therefore, if the cost of production has in any way increased, the increase must be under the head of labour. The rate of wages has increased a little, but, on the average, not so much as 15 per cent. That is to say, if the average wage was 15s. per week twenty years ago, it is not so much as 17s. 3d. now.

But the census returns show that during the same period there has been a diminution of about 18 per cent in the number of farm-labourers; so that if wages had even risen 18 per cent, the cost of labour would still be no more than it was in 1872. This is quite intelligible; for, with fewer labourers, we have also 2,000,000 acres less land under crop, and no one will contend that this does not mean a large reduction of the working expenses.

It might even be shown that agricultural labour has very much increased in efficiency during the twenty years.

The use of improved machinery has reduced the cost of labour in hay-making and in harvesting and the like, 30, 40, and in some cases 50 per cent since 1872. Thus, instead of the cost of production having increased, it has materially lessened; and the whole tendency of the time is towards cheaper production. Were it otherwise, the outlook for British agriculture would be much blacker than it is.

CONCLUSION.

It has been shown that there is no over-production in agriculture here; yet the enormous influx of foreign and colonial produce, at prices which British farmers never contemplated, is said to amount to the same thing.

There is, however, this material difference in the circumstances. If it were only over-production at home that farmers are suffering from, the reaction sure to follow as the effect of lower prices would soon regulate the supply to the demand, at prices which would leave a fair profit to the producers. But when the home markets are daily and continuously flooded with foreign produce—surplus produce which, for a time at least, must come here at any price almost—it will avail our farmers nothing to restrict the total volume of their production. It will no doubt be advisable to curtail some branches of farming and enlarge others; but at the best a very small mitigation of the

depression which is weighing on agriculture can be looked for in that direction. Foreign competition has come to stay, and it is no longer confined to one or two articles, such as wheat and wool; it extends to all, and, with one or two exceptions, threatens soon to be equally severe in all.

All proposals for the limitation of foreign competition may be put aside as impracticable; and it is doubtful if the labelling of foreign meat, or other produce, to prevent it being palmed off as British, would have the effect intended. It would give a sort of protection to indifferent qualities of home produce, which would make the cure worse than the disease. British produce of the best quality needs no such protection; and it is not in the true interests of agriculture to encourage the production of any but the best.

The legislative remedies that promise to be of most use at the present time are—

1. A measure for the better regulation of railway rates, and for ensuring that no advantage, either in the shape of rapid conveyance or cheap transit, be given to foreign produce.

2. A simplified amendment of the Agricultural Holdings Act; giving compensation for all improvements that increase the letting value; and providing a cheaper and readier process of awarding compensation for unexhausted improvements.

3. An amendment of the Margarine Act, so as to effectually prevent the sale of margarine as genuine butter.

4. Measures to prevent the sale of separated milk as whole milk; to prevent the adulteration of milk; and to regulate the sale of "filled" cheese.

Lastly, there is no use of wasting time and money in trying to farm against close competition, unless we take off all restrictions on cropping and sale of produce. These restrictions are not needed in the light of present-day farming, and only serve to paralyse energy and check the use of capital, by preventing its employment in a useful direction.

Let British farmers only see how they really stand in relation to the agriculture of any one of the many corn and meat producing countries that are now looking to this little island for a market, and the position which they have been taught to shrink from will fill them with encouragement and confidence. They will see that the market of the world is the best market in the world, and that all the legislative enactments that Parliament could give them could never secure to them so firm a position or so safe a prospect as that which arises from low prices founded upon cheapened production. By keeping down prices, and looking to the increase and economy of production for their profit, they can beat all outside competition; and they can beat it in no other way.

THE CULTIVATION OF OSIERS AS A MEANS OF UTILISING BOGGY LAND.

By W. J. COCHRANE, Glenside, Hetton-le-Hole, Fence Houses,
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MUCH interest has been taken during recent years in the utilisation of certain tracts of land, which in their present state serve only to reduce the profits, already small, which are derivable from the fields of this country. It is a fact much to be lamented by the agricultural community that so large a proportion of land has stood neglected, which might, with care and good management, have been turned to very profitable account; and it is unfortunately not until the price of wheat and other farm produce has become so low as to render it absolutely necessary for the landholder to make use of every portion of the land of which he is the tenant, that such hitherto unpromising areas have been found deserving of the notice which we are now compelled to afford them.

The object I have in view is an important one—viz., the consideration of the best and most profitable method of utilising boggy or marshy land, consistent with good farming and maintained fertility.

Drainage more or less thorough and effective has been adopted as a means of bringing such lands into a fit state for the cultivation of cereal and other crops, but this requires an outlay often far beyond the finances of the average farmer; and if we know of cases where this plan has been followed with the most satisfactory results, can we not call to mind many other cases in which, from some reason or other, it has been found unprofitable? On all these tracts or patches of boggy land there is one method of cultivation which, if properly conducted, cannot but give an adequate return for the expenditure incurred on it,—I refer to the planting of osiers or willows.

But before planting osiers there are several important considerations to which attention must be given. In the first place, the land upon which it is intended to plant the trees must be of such a nature and in such a position as to ensure their growth and development: it would not pay to break up even wet grass-land, upon which there was a healthy growth of good herbage, on which stock have thriven.

Again, it would be a very great mistake for any landholder to lay down an osier bed of any size whatever, unless he were previously assured that there would be a market for his produce,

and for this one of the two following conditions are necessary—viz., proximity to a railway, or to a town where basket-making, or some other industry in which willows play an important part, is practised.

Land for Osiers.

All the varieties of osier require a large amount of moisture, as compared with ordinary farm crops. Stagnant swamps, however, are not suitable, and such spots would require draining, but not to such an extent as to cause the land in a few years to become dry; for it must be remembered that it is just as unreasonable to expect a good bed of osiers on a dry soil as on a too wet swamp. In the first case, they soon dwindle down, become stunted in growth, and in a short time yield no return to the grower; whilst, in the second case, if too much water be present the frost and hoar-frost resulting therefrom tend to destroy, not only the tops and young shoots, but also the roots. The great objection to a too dry osier bed is, that during the spring the plants make too great a call upon the moisture existing in the soil, and thereby reduce it to such an extent as to cause a deficiency in the summer, and a check to the growth of the trees.

Provided there is a constant supply of moisture, any soil is suited to the willow, assuming, of course, that it be of such a nature as to supply the requisite amount of plant food; but the most favourable land is a drained bog, rich in "humus" or decayed vegetable matter, and situated in the vicinity of water either in the form of dykes, ponds, or the sea.

Varieties of Osiers.

If there happen to be any osier beds in the neighbourhood where it is intended to use land in this manner, the would-be planter should in a great measure be guided as to the variety he should grow by a study of plantations already growing in the vicinity; for in certain districts there is a better demand for certain varieties which, from the nature of their growth, size, flexibility, &c., make them more suited to the requirements of the local manufacturers. For instance, in a basket-making district it would be a mistake to grow a kind of willow more suited to hurdle-making, &c., and *vice versa*; but for the benefit of those living in a locality where willows have not hitherto been tried, but where it is likely there will be a market for the produce, a few remarks as to the various kinds to be recommended for the different uses to which willows may be adapted will not be out of place.

Botanists recognise upwards of ninety species and varieties; but many of these are either of such rare occurrence, or possess so few advantages over others, that the choice may practically be limited to about a dozen species. If basket-work is the main use to which they are to be put, perhaps the best kind is the common white willow, *Salix alba*, which grows fast and attains a large size, yielding tannin and salicin, while, in addition to its utility for basket-making, its wood is suitable for wattles, fuel, and chip. The common willow, *Salix viminalis*, is a very good osier for general purposes, being suited alike to rough and to delicate work; while a taller variety, the long-leaved willow, *Salix triandra*, growing to a height of 20 feet, is one of the most useful of all willows. Amongst others, I would mention *S. rubra* and *S. laurina*; whilst if the substance salicin, obtained from the bark and used for medicinal purposes, is wanted, the species *S. fragilis*, or the crackling willow, is to be recommended as being the richest in this substance, and at the same time yielding a fair amount of very good timber. For all-round purposes, I am in favour of having more than one kind in the bed or "holt," but the selection is a matter of no little difficulty, as so much depends upon the purpose for which the trees are to be grown. It is always advisable to inquire which are likely to sell best in the district, and the planter should then draw his own conclusions as to the particular species he will fix upon.

Forming Osier Beds.

The method by which willow-growing is extended is by means of cuttings or slips, taken from good strong plants before the sap has risen—that is, during the month of March for preference: the slips must not be less than 6 inches long, and must have at least two healthy buds. Usually such cuttings may be obtained dressed ready for planting at the rate of about 10s. per 1000; but when they have not been previously prepared, it is necessary to make a clean cut with a sharp knife completely round, and immediately below a bud, just as you would treat slips of rose-trees or other garden plants. All the buds and young shoots but three should be carefully removed—one of them only will be required to grow, but in every case three should be left, to allow for the possibility of any of them failing to produce a shoot.

It is a question of dispute whether these cuttings should be at once planted out on to the land where they are destined to remain permanently, or should first be "struck" in a nursery bed and transplanted during the following spring. Those who advocate the first method urge the fact that a saving of a year is thus made, and no doubt the advantage derived is an important

one, provided that the land has been previously prepared. But, on the other hand, when the cuttings are "struck" in a nursery bed, a no less important advantage is, that the slips which die off are not transplanted; whilst if they failed in the osier bed itself, gaps would occur, which would cause an uneven plantation, and, to a certain extent, a smaller produce for a few years—for even if such gaps are filled up, the new plants are one year's growth behind their companions.

Further, during the time the osier slips are occupying some portion of ground and developing roots, the land upon which they are to be transplanted can be got ready and trenched, a fact which in many cases will be seen to be of paramount importance. Whatever the variety intended to be grown, the system of cultivation and planting is the same. Where a "nursery bed" is to be made, it should be well dug and cleared of weeds, &c.; one-eighth of an acre should be allowed for each acre of osiers to be grown, and on this it is advisable to plant 12,000 cuttings. This is rather more than the number required per acre, but in order to avoid disappointment it is necessary to allow for a certain number of failures. With regard to the planting of the slips, I need only say they should be put into rows singly, about 2 inches deep, and a few inches apart each way; and the soil should be very firmly trodden down against the stem. This is done as soon after the cuttings have been taken as is practicable—*i. e.*, in March; during the summer they will not require much attention beyond an occasional hoeing, except in very dry weather, when they will be greatly benefited by judicious watering.

However the soil of the future plantation may have been occupied in previous years, it will be necessary to either plough it over and harrow it level, or dig it, which latter plan, if well executed, is the best, though it is the most expensive. If there has been a sward of grass or other herbage, it must be pared off and burned, the resulting ashes being spread over the land. If it is considered that drainage is required, the tiles must not be placed less than 3 feet deep; in the majority of cases this will be unnecessary.

It is a good plan to apply lime to the land if it has not received any for several years, or if wireworms or other noxious grubs are to be feared; but lime should in no case be applied within three months of the time when the plants are to be transplanted. If digging is practised, the land may be trenched at the same time into beds 6 to 20 feet broad, according to the size of osier to be cultivated, cross furrows or narrow ditches being formed to carry the surplus water. By following this plan the soil is deepened, there is not so great a chance of the land becoming water-logged, and the time during which the willows

are subject to the chilling influence of excessive moisture is shortened. If the plough has been used, the trenching and bedding-up should be done soon after the harrows have completed their work. In October of the year in which the cuttings were planted, the young trees which have made good roots will have attained the height of nearly 3 feet, and at this time some would recommend their removal, but it is better in every case to leave them where they are till the following spring, when transplanting may be done without fear of injury.

It is at this period that great care is needed to ensure a successful bed or "holt," for it must be remembered that the plants have to remain here for the rest of their life, and no amount of trouble should be spared in their proper planting and establishment. Rows should be struck out 3 feet apart on the higher ground (a good distance between each water-furrow being about 10 feet), so that the rows will be at even distances throughout the plantation. The plants should be placed uniformly 1, 2, or 3 feet apart (for general purposes 2 feet is the best distance); the larger species require more room than this, but in some parts of England the smaller kinds of osiers are planted 12 inches apart, the distance between the rows being only 18 inches.

Before the plants are finally placed in the ground, the shoots which have formed from the extra buds may be cut off as close as possible to the stem, allowing two or three buds to remain for the next year's growth, but all those shoots which would go below ground must be *entirely* removed. A spadeful of earth should be put round the young tree and firmly trodden down, so as to give it stability; finally, the land should be cleared up and thoroughly dressed for the ensuing summer. The cost of laying down an acre of land in osiers by using cuttings planted 2 feet apart may be shown as follows:—

Turning over one acre, two spits deep, and trenching water-furrows 10 feet apart . . .	£6	0	0
12,000 cuttings at 10s. per 1000 . . .	6	0	0
Planting cuttings at 2s. per 1000 . . .	1	4	0
Clearing up after planting . . .	0	5	0
Total . . .	<u>£13</u>	<u>9</u>	<u>0</u>

From £13 to £15 may be allowed per acre for the entire laying down of the willows, but paring may be required at a cost of 7s. per acre; whilst, if transplanting rooted osiers is practised, a little more must be allowed for the third item. If ploughing is applicable and convenient, a saving will be made; but the results of digging are better than those of ploughing.

Manuring and Irrigating.

In a general way it may be said that no manure produces sufficiently beneficial effects to pay for its use. Artificial manures (as nitrate of soda, guano, &c.) are seldom if ever remunerative; but the addition of half-rotted farmyard manure laid along the rows after harvesting gives good results, except when the land is either very rich, in which case manure is superfluous, or where water is very abundant, when its beneficial action is greatly diminished. On dry land a system of irrigation is very valuable in a willow plantation; but if owing to the position of the plantation, or the nature of the soil, an entirely artificial method of irrigating would have to be resorted to, the yield is not so materially increased as to render it worth the planter's outlay and trouble, *except, perhaps, in places naturally deficient in water*, where irrigation by some means becomes indispensable.

Flooding with sewage-water, if skilfully and carefully practised, is a great boon to the osier-grower; but unless the plants are growing in the immediate vicinity of some populous town or village this is impossible. Further, if a sewage-farm has been laid out prior to the growing of osiers, it would not in the majority of cases be convenient or profitable to so change the direction of the sewers as to bring the liquid to the plantation, as this would necessitate considerable outlay on the part of the proprietor. But in a neighbourhood where sewage-works have not hitherto been constructed, it would be advantageous to negotiate with the local board or the sanitary authorities of the district in order to obtain their consent to have the sewage run on to the land where the willows are growing; but it would be necessary to have power to run the overplus on to the adjoining land, for if too large a supply be allowed to the plantation it becomes not only superfluous, but even detrimental to the healthy growth of the trees, thus undoing to a serious extent the good which would be derived from a supply sufficient to produce a finer growth, but not so great as to cause injury.

Insect Pests.

There are not many disappointments likely to be encountered in the cultivation of osiers, but there is one danger well worthy of notice from its causing not only considerable loss annually, but from its often prevailing to such an extent as to cause a plantation to be utterly ruined. I refer to the attack of the willow beetle (*Phratora vitellinæ*), whose ravages in some years prove exceedingly disastrous, as, for example, in 1884, when in some parts of England entire crops of osiers would have been de-

stroyed had not some measures been promptly taken to meet the attack.

The beetle is rather more than one-sixth of an inch in length, of a greenish colour, with a metallic lustre, having faint spots upon the wing-cases; the under part of the body is of a reddish hue, whilst the antennæ are black. It comes forth in May from its winter retreat in the earth, accumulated rubbish under the bark of trees, posts, rails, and fences—in short, from any refuge near the willow beds which seems suited to protect the beetles from their enemies the birds. They do not appear to be affected by cold, and they are very difficult to kill either by water, poisonous solutions, or fumes.

Their long, white, cylindrical eggs are laid on the under surface of the leaves; the larvæ hatch out early in September, and are about half an inch long, dirty white in colour, having black heads and rows of black spots along their bodies. They live on the leaves of the plants, eating along the surface, and leaving their exuvæ attached to it. Towards the end of the month they bury themselves in the ground to undergo the pupa stage, from which they emerge in October. "Prevention is better than cure," and in this case decidedly so.

Various substances have been used to dislodge these insects, such as soot, sulphur, Paris Green, and London Purple, the two last having been found to produce the greatest effect; but their application is difficult, as care must be taken not to make these arsenical washes too strong for the tender willow leaves,—1 ounce to 20 gallons of water will be strong enough at first.

A plan which is a little more practical, and at the same time very effectual, is handpicking, which is done by shaking the insects off the plants into small vessels containing paraffin-oil; but in large plantations this operation could not be carried out. Prevention is a more simple matter; the chief thing being to prevent the accumulation of materials which may afford the beetles a winter refuge. Where any such exist they should be cleared away, and it is safer to burn them. When flooding by natural or artificial means is practised for the purpose of irrigation, this tends in a great measure to destroy those of the insects which have taken up their quarters below the water line: sewage-flooding has a better effect, but if the trees are not on a sewage-farm this of course cannot be carried out.

Harvesting Osiers.

The harvesting of a crop of osiers consists of cutting off the shoots, sorting them into sizes, and tying them up into bundles of so many score. No crop should be taken until the second year after planting in order to strengthen the stools, but by

the third autumn the crop will be fit for the basket-maker or the cooper. Usually the long flexible "sun-shoots" are cut annually for the basket-maker, or the first crop taken in the third year and afterwards every second year for the cooper.

Some advocate harvesting in November; but when the cuts are made at this season, the wounds so caused are very apt to be injured by frost, and this has a prejudicial effect upon the succeeding year's produce. It is better in every way to abstain from cutting the shoots until the middle of March, at which time the sap is not yet up, and there is therefore less probability of injury to the parent stem.

The entire operation of harvesting may be given out as piece-work at about 50s. per acre, if the osiers have not been sold previous to their cutting, which is, however, generally the case, except where regular buyers frequent the various districts and bargain for the crop annually. But where the growing crop is sold outright it is customary for the purchaser to send his own harvesters, who undertake the entire management, including transport. This latter method is the best for both parties, as the regular men who are sent to do the work understand the process—which is, however, very simple—better than the occasional hands who might be obtained for the purpose by the grower himself; and it is an advantage to the seller to have the crop removed as soon after cutting as possible.

But it often happens, especially where the area is small, that the grower has to harvest his own produce and await the requirements of the market; and as some intending growers may not be acquainted with the operation, it may be useful if I explain how the harvesting should be conducted. The cut should be made within three buds of the point whence the shoot issued, and in a sloping direction with the section on the underside. After the whole of the osiers have been cut they should be carefully trimmed of side-shoots, and tied up into bundles of 100. When required for keeping they must be peeled, and to enable this to be done each bundle must be immersed, thick end downwards, in water a few inches deep, and there it must remain until the sap ascends freely, which is usually by the end of the succeeding May.

The apparatus for peeling, which was used many years ago on the Continent, and introduced into this country about the beginning of this century, is a very primitive one, consisting of two round rods of iron about half-an-inch in diameter, 16 or 17 inches long, tapering a little upwards, and welded together at the one end, which is sharpened, so that it may be easily thrust down into the ground. When it is thus fixed into firm ground the peeler sets himself before it, and, taking the osier in his right hand by the thinnest end, places a foot or more of the

thick end between the iron rods, the prongs of which he presses together with his left hand, whilst he draws the osier towards him. By this means the bark is entirely removed from the wood, and the small end being treated in the same manner the peeling is completed; but a boy goes over each shoot with a knife and cleans it of any small pieces of bark which may have escaped removal during the first process. The stripped osiers are now sorted out into three sizes and tied up into bundles 4 feet or thereabouts in circumference, when they will keep in good condition for some considerable time, until a suitable market be found.

Attention to Osier Beds.

After all the shoots have been removed and placed in the water for peeling, the next operation, which should on no account be overlooked, is to trim the stools of all young shoots which are not likely to make good headway during the ensuing season. The land between the plants and the intervening furrows should now be thoroughly cleared of rubbish, in the form of leaves, weeds, and twigs, and carefully hoed, at a total cost of about 6s. per acre.

About the middle of May, or early in June, according to the progress the plants may have made, the trimming should be repeated, when the strongest and healthiest shoots only should be allowed to remain, so as to ensure good osiers at harvest; the backward or sickly ones are removed, as they appropriate food which would otherwise go to the maintenance of the stronger and more important shoots. After this a second clearing up will be required.

Osier-growing in Great Britain.

In many parts of Scotland osier-growing as a rural industry is practically unknown. Indeed it is only within the past fifty years that osiers have become a cultivated crop in any part of Great Britain, as previous to this they were imported in considerable quantities from France and Holland; but this trade having been interrupted during the protracted war of the early part of this century, the Society for the Encouragement of Arts and Manufactures offered a premium to cultivators who should raise the greatest quantity in England, the number of plants on an acre being not less than 6000.

A short time ago I became acquainted with a farmer in one of the Durham colliery districts who had been (and is still) reclaiming some 4 or 5 acres of bog land. In this swamp two natural springs occur, and if some effectual means of dealing with these be not adopted, the reclamation will in a short time

be practically void. For fully five years this tenant has been filling in the low-lying ground with large quantities of ashes, taken from the refuse-heap of an adjacent coal-mine, which he obtained free on condition that he would remove it at his own expense. From time to time he sowed the dustings from his barns, &c., upon the part already filled in with ashes, in order, as far as possible, to supply a certain amount of vegetable matter. Needless to say, this method of making land suitable for the cultivation of crops is, to say the least of it, decidedly slow, inasmuch as, for several years after the completion of the entire operation, the greater portion of the land will not yield sufficiently to pay for the labour and time expended on its reclamation, and then the natural springs must find an outlet either at the same spot, or in some neighbouring field, most probably rented by the same tenant. I do not wish to imply that this benefactor—for such he must be called—has acted wrongly in thus reclaiming such a piece of land, but I do say that, had he at first dealt solely with the springs, and conveyed the water to some place where it might have been utilised, and subsequently laid out these few acres for the cultivation of willows, he would have turned them to more profitable account in a far shorter time with less labour, and an ultimately less outlay, than under the method he adopted. As it is, he can have but very little prospect of obtaining any satisfactory remuneration for a long time to come.

Uses of Osiers.

All farm produce—such as wheat, barley, oats, turnips, cabbages, &c.—have their special uses, but it would be difficult to find any crop, with perhaps the exception of wheat, which can be put to so many uses as osiers; the different varieties, sizes, and ages of growth being severally suited to different industries conducted more or less extensively throughout Great Britain and Ireland.

The slender or more flexible varieties form the mainstay of the basket-making industry practised so greatly in Ireland, and are also used for bonnets, work-tables, and numerous other articles included under the term “wicker-work.” Again, the cooper disposes of large quantities of the stouter osiers for making barrels, hogsheads, and casks of every description. In Suffolk, and other low-lying parts of England, large willow-trees are common. In spring the long straight branches are cut and split for making sheep-hurdles, and are sold at 1s. each; but these branches are seldom of less than three years’ growth. Another use to which the plant is put yields but little profit to the producer, but is, nevertheless, of general importance: I refer to the extraction of “salicin,” a juice

found in the bark of certain species of willows and poplars. This substance is used as a drug, and during the recent never-to-be-forgotten epidemic of influenza it played a very important part in the treatment of affected patients. The finest, or rather the most slender, species of osier is still imported from France for making the more delicate hats and bonnets for ladies; but there is no reason whatever why this importation should not be entirely superseded by home-grown produce.

One might say that the cultivation of osiers was a subject out of the ordinary line of the British farmer, and that attention was more deserved in the direction of the arable land, with a view to increasing the quantity and improving the quality of our grain, and this is true to a certain extent. But have not agricultural affairs come to such a pass as to render it a question whether we should continue to grow wheat at all, or should give way entirely to the farmers of other countries, who are able to export it at a profit greater than that which the English grower can obtain in the country where the grain is raised? Year by year the acreage under wheat is becoming noticeably less; and, indeed, were it not for the enormous utility of the straw, the majority of our farmers in the North would ere now have abandoned its cultivation. It ought to be with a feeling of gratitude, therefore, that a farmer should receive information on any subject which may in any way make up for the low prices he has to be content with for the ordinary produce of his land. Will it not be an advantage, then, to utilise boggy parts of the farm in the manner which I have endeavoured to describe? Undoubtedly so.

It is seldom that farmers are able to obtain much more than £8, 10s. per acre for average crops of grain under present circumstances; but from an acre of land under osiers it is no uncommon thing to realise half as much again. Indeed, I once heard that a grower in Suffolk had obtained the handsome sum of £22 per acre for his harvest; but this is exceptional, and I cannot guarantee its authenticity. The usual price runs to about £12 for the crop sold as it grows; but in many cases, after the holt has once been established, this is almost all profit, and it must be borne in mind that many spots where osiers may be grown are unfit for use in any other way.

On sewage-farms, the number of which is rapidly increasing, it has been the custom to grow grain and other crops, notably cabbages; but the reluctance manifested amongst the inhabitants to vegetables grown with the aid of sewage is so great, that consumers prefer to buy an inferior article from the market-garden. To remedy this, the attention of the sanitary authorities has been directed to the growth of a more suitable and as

productive a crop to take the place of others which are no longer profitable; and in the industry of sewage-farming, osiers now take a leading place on the list of products recommended to be grown.

NATURAL REGENERATION OF SCOTS FIR WOODS.

By A. C. FORBES, Bowood, Calne, Wilts.

THE systematic regeneration of woods by self-sowing, or what is known as "natural regeneration," has not hitherto been adopted to any great extent by British foresters; and when the conditions under which they have to work are carefully considered, there is little probability that the system will ever become general in this country, unless those conditions are considerably altered, as a result of a more extended knowledge of the principles of forestry.

As pointed out by Professor Somerville in his opening lecture on Forestry, 1889, the principal obstacle to such a system being adopted with success in Great Britain is the injurious influence that game exercises over British woods. The injuries inflicted on young trees by hares and rabbits are too well known to require description, but it appears to be an excess of those animals that produces such baneful results in young woods; and there is no reason why a proper proportion of them should not be allowed to exist, and good results be obtained by natural regeneration at the same time.

But the chief hindrance to the natural regeneration of woods composed of broad-leaved species is not so much the game itself as the under-cover, which is considered a *sine quâ non* wherever pheasants are reared or ground-game encouraged. This under-cover usually consists of any shrubs that will grow under the shade of trees, in addition to such indigenous plants as brambles, holly, hazel, brackens, &c., for the growth of which it is necessary for the trees to stand far enough apart to allow plenty of light to penetrate between them to the ground. This growth prevents any regular or uniform crop of seedlings, and interferes with the accumulation of humus on the surface of the ground, which is usually necessary before a suitable seed-bed can be obtained.

It is true that many oak and beech woods may be found in the south of England which have reproduced themselves for

centuries under such conditions, but the timber produced by them is usually coarse, crooked, and defective, owing to a want of proper nursing and drawing up during its earlier stages of growth, while a large proportion of worthless species find their way into the woods, and take the place of the legitimate crop. Ignorance of silviculture may be responsible to a certain extent for the condition of some English woods, independently of game considerations, but the results are much the same in both cases. Where coppice is grown and properly managed, however, their condition is usually improved, as it obviates the necessity for worthless cover to a great extent, and, when a fair demand exists, proves a remunerative crop.¹

It has been observed, and is generally believed, that rabbits do not attack self-sown plants, although they invariably destroy planted ones. This rule, however, only holds good to a certain extent. In the first place, seedlings of all trees are devoured more or less during their first year's growth, unless they happen to be protected by herbage of some sort, such as grass or heather. The latter serves as a kind of screen to hide the seedlings from the notice of rabbits, and the grass provides them with food. It is true that the total absence of herbage from the surface of the ground is usually accompanied by a corresponding absence of ground-game, but this desirable state of matters (from a forester's point of view) can only be brought about by maintaining a perfect leaf-canopy over a considerable area, and not merely over a few acres.

The principal reason why planted trees are most frequently attacked by ground-game is apparently the stunted and sickly condition into which they are thrown by the operation of transplanting, and not owing to any preference for the transplanted tree on the part of the animal. If it were possible, in general practice, to transplant carefully enough to prevent the plant receiving any check, there appears to be no ground for supposing that it would be more liable to game attacks than a self-sown one under the same conditions as regards soil and situation, as it is certain that self-sown plants are often molested, although they do not succumb so readily as those already exhausted by a recent shift.

This preference shown for unhealthy plants is not peculiar to ground-game, but to a great extent is characteristic of all tree-destroying creatures. It is not invariable, as perfectly healthy trees are sometimes barked by rabbits even after they are thoroughly established, although the adjoining one may be left untouched. But although few species can be said to be

¹ Except in favoured localities, it is doubtful if this still holds good, the price of underwood having fallen so low during the last few years.

entirely free from the attacks of game, it is a well-known fact that some are much more greedily devoured than others; and while some are destroyed immediately after being planted, others are touched only during severe weather and when the more relished food runs short. Generally speaking, introduced species are more subject to attack than indigenous plants—larch, spruce, and silver fir often being destroyed before Scotch fir. This may be owing to the latter tree being less affected by unfavourable climatic conditions, and consequently less prone to fall into bad health, while its adaptability for nearly all descriptions of soils may enable it to recover its natural vigour more rapidly than other species.

It may be allowed, then, that self-sown plants, when once past the seedling stage, are, *cæteris paribus*, less liable to injury by ground-game than transplanted ones; but that this advantage possessed by the former is only held so long as they are strong and healthy, and also that they require protection during the first year's growth wherever ground-game abounds. This protection, however, is very difficult to obtain in conjunction with a proper seed-bed; and it is doubtful if any attempt at regeneration would be successful so long as the ground-game exists in any great quantity, as will be seen when we consider the conditions which are necessary for successful regeneration.

When a crop of forest-trees has reached maturity, and it is desired to restock the ground with self-sown plants, two indispensable conditions must exist—viz., a plentiful supply of seed, and a loose, friable surface-soil for its germination. Seed is usually plentiful in a mature forest; but when the crop is very thick and close, the limited surface exposed to the sun interferes with the production of fruit—well-ripened wood being alone capable of forming flower-buds. When such is the case, the most vigorous trees should be carefully isolated a few years previous to the cutting of the main crop, or at least such a number as may be necessary for securing a regular distribution of seed. This brings a larger proportion of branches under the influence of the sun's rays, and secures the more perfect ripening of the wood, and consequently a larger yield of fruit.

In securing a proper seed-bed without having recourse to artificial means, it is almost imperative that the ground should be entirely free from herbage or rubbish of any kind. This condition rarely exists except where the leaf-canopy of the mature crop is almost perfect, and has effectually exterminated all minor vegetation. When the trees have stood so thickly as to exclude a free circulation of air, however, the fallen leaves, branches, and other *débris* usually accumulate at a more rapid rate than their decomposition proceeds, with the result that

a layer of dry leaves, sticks, &c., several inches in depth, covers up the decomposed vegetable matter or humus proper. Any seed that falls on this upper layer of inert matter may or may not be able to germinate, according as the essentials of germination—oxygen, heat, and moisture—are present in the proper proportions or not. But even supposing sufficient moisture (the element usually deficient) to exist, in order that germination may take place, it is evident that the requirements of the young plant, in regard to plant-food, will not be met by the layer of dead leaves, and therefore it invariably perishes before it can reach the more suitable matter below.

In order to remedy this condition of the surface, the annual fall of foliage must be diminished, so that decomposition may proceed more rapidly. This is effected by thinning out the trees to about half their former number, which not only prevents further extensive additions being made to the surface layer, but also allows sun and rain to reach it, and hasten the process considerably. Fungi and other organisms also carry on their respective duties, and after a short time, according to climatic conditions, &c., the dry matter is converted into a vegetable mould, which forms a most suitable seed-bed for a regular crop of young plants.

The above remarks may be considered as being applicable to woods in general. Let us now consider them in their application to coniferous woods, more particularly those in North Britain.

Generally speaking, under-cover, as already defined, does not exist to any great extent in the woods and plantations of Scotland. This is probably due to the fact that pheasants are not reared on such an extensive scale in the north as they are in England, and therefore its presence is unnecessary, while the luxuriant growth of heather in the majority of Scottish woods provides the necessary cover for ground-game when its encouragement is desired. In plantations formed on old agricultural land, grass usually takes the place of the heather, in which case the plantations are usually grazed by sheep and cattle after the trees are out of danger of being injured by those animals.

The difference in the character of the undergrowth in Scottish woods, and that usually found in woods in the south of England, is consequently very marked, and is due principally to the following causes. In the first place, Scottish woods are chiefly composed of coniferous trees, while those of England principally consist of deciduous species. Not only is the shade afforded by the former trees much less dense than that of the latter, but the annual fall of leaves or needles from coniferous trees is relatively much smaller in bulk than that from broad-leaved species; hence the result that, whereas any herbage is

quickly choked and covered up under the shade and fallen leaves of hardwoods, it is able to live and thrive under the ordinary shade of coniferæ. Much depends, of course, upon the density of the leaf-canopy. Trees with heavily-foliaged branches, or shade-bearing trees, such as spruce or silver fir, check undergrowth much more effectually than the larch or the majority of the pines, which allow more light to penetrate through their crowns than the former species.

But although the species which compose the crop affect the character of the undergrowth to a considerable extent, its presence or absence is determined by the density of the crop of timber. While Scottish woods compare favourably with those in any other part of the United Kingdom, most of the scientific forestry experts who have visited them during the last few years concur in the opinion that they are rather over than under thinned; and it is to this fact that much of the existing undergrowth may be attributed. It must not be supposed, however, that this is due to want of silvicultural knowledge on the part of the forester, but rather to causes and circumstances over which he has little control. For instance, the majority of proprietors like wisely, but perhaps too well, to see healthy and vigorous trees in their plantations, and have a superstitious horror of anything that approaches crowding, especially during the early stages of growth. This leads to more attention being paid to the requirements of individual trees than to the production of a mass of clean-grown timber; while the indefinite development of the central axes of the stems of coniferous trees generally renders drawing up unnecessary in order to produce straight stems, as is usually the case with hardwoods. Picturesque considerations may also have something to do with this point, as a plantation of young trees clothed with healthy-growing branches is certainly more pleasing to the eye than a plantation composed of almost bare poles, or stems covered with dead branches.

The prospect of a quick return from early thinnings is another inducement to overthin, although the future value of the plantation may be considerably reduced thereby; while estate requirements are often the means of causing the removal of many a young tree long before the proper time. When wood is required for gate- and fencing-posts, stack-props, sheep-stakes, or any other articles constantly in demand on an estate, it is frequently the custom to take them from the nearest and most convenient plantation happening to contain the size and description of wood required, irrespective of any consideration as to the requirements and wellbeing of the plantation. Looking at this question from a proprietor's point of view, however, it is only natural that he should consider the present appearance

and requirements of his estate of more importance than the prospective value of a crop of timber fifty years hence; and thus it happens that proper thinning is more often advocated than practised.

Whatever the actual cause of thin woods may be, however, one thing is perfectly clear—viz, that their condition in this respect is responsible for much of the undergrowth existing in them. Although this undergrowth is by many supposed to interfere little with the growth of the trees, yet it cannot be denied that it appropriates much of the available plant-food in the soil for its own use, while it prevents that mechanical condition of the soil being maintained which is always produced by a layer of humus, and which is so important to the growth of the trees.

But it is probably with natural regeneration that its injurious influence is most felt, although few systematic attempts are made in this country to bring that process about. In the case of the ground being covered with grass, especially where it has been grazed by sheep and cattle, natural regeneration is effectually prevented from taking place, as its tough binding roots make one of the worst seed-beds for the seedlings of coniferæ, although hardwoods manage to germinate in it pretty freely. Coniferous seedlings are more delicate and less robust than those of hardwoods, and while the latter are able to push down their strong radicles through the roots of the grass to the soil beneath, the former rarely succeed in doing so, and therefore perish for want of sustenance. The seeds of hardwoods, too, with the exception of birch, alder, &c., are usually heavy, and have a better chance of getting nearer the surface of the soil itself than the lighter seeds of conifers. Where the grass is thin, and has not had time to form a turf, its presence is less objectionable, as the soil is then in a free and more easily penetrable condition. Heather, although it forms no turf in the same way as grass, yet prevents the successful growth of seedlings quite as effectually, but in a different way.

On open moors heather presents no obstacle to the seed in reaching the soil, but is rather an advantage than otherwise, as will be shown hereafter; but in woods and places where the sun and wind have no free access to the soil, various mosses grow among the stems of the heather, and cover up the surface. In coniferous woods the growth of the moss is considerably encouraged by the shade of the trees and the fallen needles; and each year's growth being a continuation of the last, a stratum several inches from the surface of the ground is soon formed, and intercepts most of the seed as it falls. Any seed that may germinate on the moss quickly perishes in the same way as it does on grass. In addition to grass and heather,

brackens, whins, bilberries (*Vaccinium myrtillus*), &c., are frequently met with in thin woods, and interfere with regeneration by preventing the seed from germinating, or choking it after germination has taken place.

It is evident, then, that the surface must be almost bare of any sort of vegetation before any operation for the natural regeneration of the wood can be commenced with any chance of success; and the cheapest and most effectual method of keeping forest ground clear of undergrowth is that of keeping the trees in close order, and preventing light from reaching the ground. In the case of heather, where the moss coverings of the stems are the chief hindrances, and not the roots, burning can be resorted to after the trees have been thinned, without incurring much risk of damaging the standing trees,—the impediment being thus removed with little expense, while the young growth which proceeds from the stumps forms excellent shelter for the seedlings from frost and the notice of ground game.

So much for the general conditions necessary for the reproduction of coniferous woods. Let us now consider the special peculiarities that have been observed in obtaining successful regeneration in the case of Scots fir woods.

Any one who has been in the habit of observing the characteristic features of woods composed of one species of tree, as are most of our natural forests, must have been struck with the monotonous sameness and lack of variety that Scots fir woods invariably present to the eye. This is principally due to the total absence of young trees growing up in conjunction with, and under the shade of, the older generation, such as is usually seen in natural forests of other species, giving an agreeable variation to the general appearance of the forest at all seasons, and relieving the bare stems of the parent trees.

This absence of young trees cannot be owing to any lack of productiveness on the part of the standing trees, as the Scots fir is one of the most regular and prolific seed-bearers that exist in this country; and the fact that the seed itself is not abortive is sufficiently proved by the great number of seedlings that may be found under the shade of old trees during the summer months.

Wherever the trees stand thick enough to keep down the rubbish beneath them, these seedlings may be found by the score from May to September; and allowing 80 per cent to perish by means of the ordinary casualties to which seedlings are liable, a fair crop would still be left upon the ground from one year's crop of seed. Instead of this being the case, however, it is extremely rare to find a one-year-old seedling in a Scots fir wood, even although the ground may be free from game;

and where one does happen to exist, it is invariably found to do so under special conditions, and the question arises—To what can this mortality be attributed?

It is well known that the dead foliage of Scots fir decays less rapidly than that of most other trees, which accounts, in a great measure, for a dry footing being always obtainable in Scots fir woods, even after a period of wet weather. The process of decomposition, however, is considerably assisted by several saprophytic fungi (*Thelephora laciniata*, &c.), the mycelia of which permeate the layer of decaying needles, immediately below the surface. The roots of the trees push freely into this layer, and the coral-like growths, or *mycorrhiza*, which are supposed by Frank to play an important rôle in the assimilation of organic matter, are numerously developed on them.

It is in or immediately above this layer that the majority of the seeds germinate, and the young plants invariably perish in it a few days after showing themselves above-ground. That the mould itself is the principal factor in their destruction appears extremely probable. I have examined hundreds of seedlings growing, or that had been growing, under the shade of Scots firs, and have found two out of every three that were growing in this mould-infested layer either dead or dying before they had been above-ground a fortnight. The part of the seedling usually affected is the upper part of the radicle, which decays or “damps off” in the same way as seedlings of annuals when kept in a confined atmosphere and in a crowded condition.

The chief peculiarity to be noticed in the damping-off of fir seedlings is that the central axis of the plant only appears to be affected by the fungi, and not the secondary roots, when these have had time to develop. When the seed germinates in moss, or any other medium of sufficient depth that may overlie the fungoid layer, the extremity of the radicle may be observed to perish after reaching the layer; but the part above that has not come in contact with it throws out secondary roots, and sometimes a pseudo-radicle, which, although reaching the dry matter, appears unaffected by it, although the plant usually fails to establish itself in the ground. The exact stage of the seedling's life at which death ensues varies much. Sometimes it occurs before the cotyledons have properly expanded; at others, and especially during wet weather, it appears to survive much longer, but in all cases it takes place while the tissues of the young plant are still soft and succulent.

That this fungoid layer is, *per se*, fatal to the seedling, and that its decay is not due to any atmospheric condition caused by the shade of the trees, is probable from the following observations. In the first place, wherever the surface has been cleared

of this *débris*, either by artificial agency, such as the dragging of timber, &c., or by natural causes, such as being washed off by heavy rain from the ground having a considerable slope, and seedlings have germinated on these bared spaces, they invariably thrive more or less if unmolested by vermin. On part of a Scots fir wood which had been partially cleared at various periods during the last few years, a number of seedlings had come up round about the standing trees, the majority of which were from ten to twelve years old, and upon making inquiries I learned that the period which had elapsed since the last cutting of any importance had taken place coincided closely with the age of the trees. The only conclusion I could arrive at in connection with this was, that the cutting and removal of the timber had disturbed and laid bare the surface in many parts of the ground, and therefore the seedlings germinating on these parts were unaffected by any decaying matter. Scarcely any seedlings had come up on the ground since that time, owing to a rank growth of heather and moss.

Seedlings, too, frequently germinate upon the decaying roots of cut trees, and even in the fissures of the bark of standing ones, and may sometimes be found several years old in such situations, the roots penetrating between the bark and wood of the stump, or between the scales of the bark. These last-mentioned instances tend to dispose of any theory that might regard the shade of the growing trees to be the cause of decay, and also of an equally reasonable one—viz., that the damping-off of the seedlings originated through lack of nourishment. Before this last-mentioned theory could be entertained, it must first be explained how it is that seedlings of larch, spruce, silver fir, and various hardwoods are able to exist in the same material as that in which Scots fir seedlings die off; for seedlings of all the former trees may be found growing in the fungi-infested *débris*, and apparently unaffected by it, although many of them (the larch especially) are quite as delicate and liable to injury as Scots fir. Moreover, that the latter tree is able to obtain a footing in situations where many other plants would perish is proved by its establishing itself on the face of bare rocks and other unfavourable positions; while its indifference to the matter in which it grows is (with the one exception in question) equally marked, for I have found healthy seedlings growing in pure sawdust, ashes, decaying wood, and even in the holes in old fir-stumps from which weevils had made their exit.

Although I believe the fungoid layer to be the main factor in the destruction of the seedling plant, there are probably other agencies at work in the same direction. In thick fir woods, an aphid, *Rhizobius pini*, preys upon the young roots and fibrils of

the trees, principally attacking those roots growing in the decaying matter. Although extremely numerous, these aphides appear to do no estimable damage to trees of any age, but with the seedling the case may be otherwise. I have noticed that they attack seedlings at all stages of their first annual growth, and at any part of the roots, frequently congregating round the collar, and appear to kill off a great many that have germinated in places nearly free from the fungi. Such, at least, appears to be the case so far as my experience goes, as I have often found seedlings growing in what might be termed a suitable medium for their development, but which were dying off from no other apparent cause than the injuries inflicted by a colony of these aphides, which had established themselves round the radicle. It is probable that the seedling, even when not actually destroyed outright by them, is yet so weakened as to be unable to withstand the ordinary vicissitudes of life to which it is exposed; and thus the aphids may be said to be chiefly instrumental in its destruction.

Such appear to be the two principal agents in obstructing the regeneration of Scots fir woods, and it would be of considerable interest to know if this peculiarity in regard to it has been observed in connection with any other species. That such is not the case with the majority of the acclimatised coniferæ in this country has been already shown in the case of larch, spruce, silver fir, &c., and the fact that instances of this kind are not more common has already been accounted for in dealing with ground-game. That it is not peculiar to the Pine genus generally is also clear. In a comparatively thick plantation of mature Scots fir on the Woburn Abbey estate, in which a sprinkling of Weymouth pine had been introduced, I noticed a great number of seedlings of the latter tree growing freely under the shade of the firs, although no growing Scots fir seedlings could be seen except where openings occurred in the wood. When the fact is taken into consideration that the Scots fir seed must have been shed in far greater quantities than that of the Weymouth pine, the presence of seedlings of the latter, viewed in conjunction with the absence of seedlings of the former, goes far towards confirming the theory that the Scots fir stands almost alone in regard to this peculiarity in natural reproduction.

The effect of being thus handicapped in reproducing itself is soon apparent in a wood of this tree in which other species have been introduced or have crept in from seed. If such a wood be left alone after a severe thinning, the seedlings of the intruders gradually but surely usurp the ground originally occupied by the pines. In elevated situations this seldom occurs, owing to few species being able to exist in such situations,—birch, mountain-ash, and willows being about the only indigenous species

that transgress in this way in the north. Where birch is present, however, it invariably takes the place of the fir after the latter has been cut or blown down, and when such is the case, successful regeneration of the fir is impossible without resorting to artificial methods. The power that birch possesses of germinating and succeeding among moss and heather is greatly in its favour where those exist, while that covering prevents the more delicate fir seedlings from obtaining a footing, consequently the birch comes up thickly and soon forms a dense thicket.

Its immunity from game attacks also greatly favours it, for it scarcely ever appears to be barked by rabbits in the same way as other trees. But on more fertile ground, adjoining woods or plantations composed of other trees, this crowding-out of the fir is still more probable. An instance of this has already been given of the Weymouth pine, but most of the other common coniferae are equally dangerous, the silver fir probably being so to a greater extent than the others. Not only does it succeed well under a dense shade, but its seedlings appear to be less frequently attacked by rabbits than those of other species; while their more vigorous structure and greater root development during the first year or two of their existence enable them to push their way through a moderately thick growth of moss and heather. On a bank or piece of sloping ground on the Cullen House estate, from which almost the whole of a crop of Scots fir had been removed, and which adjoins a hollow filled with silver fir, larch, spruce, and hardwoods, seedlings of all the last-mentioned trees have come up among the remaining Scots firs, but the silver firs are by far the most numerous, although rabbits are plentiful in the locality.

Beech also being a good shade-bearing tree, is often found taking possession of Scots fir ground. The presence of heather appears to be a great advantage to seedlings of this tree in the north, as it not only protects them from game, but also serves to shelter them from late frosts, which are very destructive to the tender seedlings.

Having gone over the principal obstacles which prevent or interfere with the successful regeneration of Scots fir woods, let us briefly consider how best to avoid them, or remove them where they already exist.

In the case of an unmixed fir-wood reaching maturity, and which it is desired to regenerate, the whole of the trees should be cleared off the ground, or its various divisions, within three or four years from the commencement of cutting, with the exception of those trees left to furnish seed. This rapid cutting prevents the growth of heather and moss, which interferes so much with the regular germination of the seedlings, taking

place before the raw humus is decomposed, while it hastens decay by preventing fresh falls of foliage, and exposing the ground to sun and rain. On very steep slopes, however, it would be advisable to cut more gradually, especially where the trees have been standing so thick as to exterminate the heather, as the sudden removal of the timber would render the ground liable to be washed by storms and heavy rains. This would seriously affect the fertility of the soil, which is rarely too good in such situations, and the removal of the timber would assist the breaking of the surface, and thus allow many seedlings to get into the soil before it could be again covered with needles. In such, and other situations, where the exposure of the soil would have an injurious effect, the surface might be broken artificially, and the remainder of the old crop left until the young had established itself.

After the final cutting of all trees but those intended for seed, the ground should be gone over with a rake and all dead twigs and branches collected and burnt; and if the value of the stumps will pay for their removal, as many of these should be taken out as possible. If at all wet the ground should be drained, or if that has already been done, the old drains cleared out where necessary, and the soil distributed over the surface. The latter is an important operation, as the ground often becomes water-logged after the trees have been cut, and when such is the case it is useless to expect the seedlings to thrive, and they only become stunted and deformed trees, and of no use for anything but firewood.

This is all that is absolutely necessary to be done in order to obtain a good crop of seedlings, which, however, do not appear until the *débris* is thoroughly decomposed, and the heather has commenced to grow and provide shelter for the young plants from sun, frost, vermin, &c. The length of time which ensues before these conditions are fulfilled depends a great deal upon climate, elevation, and nature of the ground, &c. On low ground decomposition of the foliage and growth of heather proceed much more rapidly than on elevated spots; while on sloping ground heavy rains wash away a quantity of the dead matter, and hasten the disappearance of the obnoxious fungi. Generally speaking, the commencement of a successful regeneration begins in from two to six years, provided ground-game has been kept down, but in unsuitable situations a longer period may be required; while unfavourable seasons occasion delay.

The number of trees selected for seed production need not exceed ten or twelve per acre, but they should be vigorous, well-formed trees, and of the best variety, those having short horizontal branches being most suitable. A certain number should stand as close to the windward edge of the clearing as possible,

in order to take advantage of the distribution of the seeds by wind; and unless the clearing be very extensive, the majority should be near the roads or drives, so that they may be removed after serving their purpose, without injury to the young trees.

In a report made to the Canadian Government on the management of European forests, it was stated that the general practice in Sweden, when cutting pine timber, is to leave six or seven seed-trees to about every quarter of an acre, which are cut after five or six years. This is double the quantity that I have recommended; but the liability of suddenly isolated trees to be overturned by wind may render the leaving of such a number advisable, although I consider the fewer the trees left, beyond those actually required, the better. After a sufficient number of seedlings have appeared, the seed-trees may be removed, and it may be necessary to plant a few young trees on the sites they occupied, in order to make the cover as perfect as possible.

In thin woods, where heather and moss are very rank, the latter must first be removed before regeneration can take place. The easiest way of effecting this is by burning, and if the crop be very thin, it should be done before the trees are removed, as the fire burns out too rapidly to do any injury to the standing trees. The reason for burning before, instead of after, the trees are removed is, that the fire burns up the loose matter on the ground and leaves a hard crust on the surface, which is very unfavourable to the germination of the seed. The removal of the trees destroys this crust and leaves the surface less impervious to air and moisture than would be the case were it still to exist; and in all cases where natural reproduction is desired, the removal of the timber by dragging will be a great advantage, as it stirs and breaks up the surface and exposes the soil in many places, thereby giving any seeds that may germinate on such places a chance of developing into plants.

When burning before cutting and dragging of the timber is impracticable, it would probably be beneficial to turn cattle or sheep on the ground for a year or two in order to destroy the moss and enable the seed to get down to the firm ground. Cutting or pulling the heather would be better than any other method, if it could be done cheaply, but that is doubtful.

The system adopted in the Strathspey forests, where natural regeneration is very successful, is that of gradually cutting out the trees in patches, and allowing the young plants to appear before any extensive clearing is made.

The Skye and Curr plantations on the Seafeld estates in the Strathspey district are wonderful examples of what may be done by judicious management in the way of regeneration. The young crop of self-sown wood in these two plantations is

as perfect and regular as could possibly be desired, the trees being considerably thicker than those in an ordinary plantation containing no gaps or blanks. The former crop appears to have been very thick, and therefore to have exterminated the heather. The cutting and removal of the trees stirred up and penetrated the loose *débris*, and laid bare a large portion of the soil, consequently the seedlings were able to obtain a hold in a suitable soil, and were unaffected by fungi.

The general absence of rabbits on the ground seems to have had something to do with the success of the young crop, although when the plants receive the protection of grass or heather they are not so liable to injury. The unmixed character of the former crop probably had something to do with it, as no birch or other hardwoods have interfered with the legitimate crop; larch being the only other species that previously existed, and a considerable number of seedlings of that tree have appeared in the Skye plantation.

The most important point in connection with regeneration of this tree, then, is apparently the absence of the fungoid layer. This may be attained, as we have already seen, by either allowing the *débris* in which it grows to become thoroughly decomposed, or by breaking up or exposing the surface-soil by artificial means. In all cases where practicable without incurring much expense, the latter method is much the best, as it prevents the surface of the ground being exposed to sun and drying winds (as is the case when clear cutting is adopted), for the reason that the ground can be restocked before the old crop is removed, whereas in the former case clear cutting is usually necessary before regeneration can commence. It is a difficult matter, however, to break up the surface sufficiently well without special work being done for that purpose. The cutting and removal of trees taken out in the preparatory thinnings (or thinnings made with a special view to reproduction) may do much towards stirring up and exposing the soil, but it is clear that this alone will not effect the bringing of the surface into the required condition, although, as may be seen in some of the Strathspey woods, it does much in that way. In consequence of this difficulty, then, it would probably be safest to clear cut, either as already described, or in strips or patches, as carried out in the Strathspey woods referred to.

Let us now look at the comparative advantages of regeneration of Scots fir woods by self-sowing and by replanting.

The advantages which self-reproduction possesses over replanting in the case of woods generally are too well known to require notice, and do not apply to Scots fir woods in particular. But it may be thought that the length of time which must ensue before the self-sown crop can be fairly established is a great

disadvantage in that method, especially when the cost of replanting an acre with one- or two-year-old seedlings is comparatively light. But it is doubtful if planting can be properly done at a cost less than 24s. per acre; and when the compound interest on that sum has accumulated during a long cycle, it will be found to decrease the net profits of the crop considerably.

But apart from this, a difficulty presents itself in immediately replanting Scots fir woods which is not met with in other species commonly grown in this country. This arises from the ravages of the Pine-weevil (*Hyllobius abietes*), which often completely destroy newly planted trees of the coniferous class on recently cleared ground. This beetle destroys the bark and shoots of the young trees, usually preferring those from two to six years old; and although it does not confine its attacks to transplanted trees alone, yet it is on such trees that its ravages are most alarming. Its attacks on newly planted Scots firs are so well known that it is considered almost a waste of time and money to replant that tree on newly cleared ground by means of notching, and pit-planting is generally acknowledged to be the only effectual method of counteracting its destructive power. This means an additional planting expenditure—say, 35s. or 40s. per acre instead of 24s. To avoid this additional expense replanting is often deferred for four or five years, until the weevils or their descendants have sought fresh feeding-ground. Whether the non-destruction of the young plants is due to the absence of the weevil, or to the better health of the young plants in consequence of the decomposition of the *débris* rendering the ground more suitable for their growth, is a question still open to discussion.

It is doubtful if ground surrounded by old woods, or woods that always contain decaying stumps, can ever be entirely free from the insect; and therefore, unless the ground be isolated from plantations of fir and pine, it seems extremely improbable that the insect can ever be absent. The success which usually attends pit-planting can only be reasonably accounted for on the assumption that this system gives the plant more favourable conditions for recovering its normal state of health, and consequently renders it less liable to insect attack.

A statement made by Miss Ormerod, in the first edition of her 'Manual of Injurious Insects,' goes far to confirm the above theory. After describing various remedies for the pest, Miss Ormerod concludes her article on the Pine-weevil in the following words: "One important point yet remains. It appears that the young plants are most attacked after transplanting, and probably in this case, as in many others, the temporarily altered state of the sap attracts the insect feeder, and (as in other cases)

all possible care to avoid what would prolong this state or cause a sickly growth should be afforded ; and when a large extent of ground is covered with pine plantations, a very strict supervision of the method in which the labourers put in the young trees could not fail to do much good."

Whatever may be the cause of attack, however, the interval which must ensue before notching can be safely adopted in replanting the ground is nearly, if not quite, as great as is required for natural regeneration, while the latter method saves all planting expenses.

That the timber produced by self-sown fir woods can compare favourably with that grown in plantations is proved by the excellent quality of the timber yielded by natural forests, both in this country and in the vast Scandinavian forests. The quality of self-sown fir is said to be so superior to planted trees, that the timber of the one can be easily distinguished from the other, although both may have grown on the same description of soil. This, however, seems questionable.

In certain cases natural regeneration need never be attempted. In neglected woods broom and whin find their way in and quickly spread over the ground, and effectually prevent any smaller plant from existing at all. Burning, although clearing the ground for the time being, only produces a thicker growth from the old stumps when they are left in the ground, and it is almost impossible to get rid of them sufficiently to allow self-reproduction to take place.

Another case sometimes occurs when woods contain a large quantity of birch, the seed of which quickly germinates on any cleared ground, and the young plants crowd out the fir. Cutting the birch a year or two earlier than the fir might prevent this to some extent ; but owing to the seed spreading so extensively, it would have to be done over the adjoining ground as well as the part intended for natural regeneration. Of course, when a crop of wood of any kind is merely desired, the birch will restock the ground quite as effectually as the fir, but this is outside the question under discussion. In both the above cases planting must be considered to have the preference, and in any others of a similar nature.

In conclusion, it is not contended that the yield from self-sown ground is greater than that from a carefully managed plantation, as in most cases it is probably less, in consequence of a certain amount of irregularity which will always exist in the former ; but what is contended is that the natural system is the most economical for the large landed proprietor, owing to the initial expenditure being reduced to a minimum. This is, essentially, one of the most important considerations in regard to forestry, as the long period which must ensue before

any return can be expected from plantations naturally causes many proprietors to hesitate before engaging in extensive planting operations. This fact, considered in conjunction with the thousands of acres now existing in Scotland which bring in no returns whatever, but which are well adapted for growing Scots fir, makes it the more imperative that Nature should be taken advantage of as much as possible, whether in the formation or reproduction of forests on such ground.

FARM FENCES.

By THOMAS DYKES, Bent, Lesmahagow.

OF all the various equipments of the farm, perhaps none are more liable to be treated with neglect than the fences. Various reasons might be assigned for this, but it arises principally from the fact that, except in the case of iron or stone fences, many of them require frequent repairs, such as mending or trimming. Though there can be no doubt that the hedgerows and fences in Britain have, as a rule, a much better appearance, and are more trimly kept than those of our American competitors, yet we must say the fences in this country reflect less credit on us than does our agriculture generally.

One will often observe in passing along country roads, or on being privileged with a nearer inspection of the farm, hedges and other fences in a more or less unsatisfactory condition. In the case of hedges, frequent gaps occur, necessitating palings or wire to be freely used in order to give them the consistency necessary to make them fences at all. If one has a keen sense of the ludicrous, and keeps on the outlook, he will occasionally see amusing attempts at mending,—all kinds of things, from old boards and branches, and even implements, being used to fill up the gaps. These, however, are exceptional cases. On many estates all through the country the fences are everything that can reasonably be desired.

Hedges.—In agricultural districts generally, the most common kind of fence is a hedge of either white thorn or beech, and frequently of both combined. In many places in England we are surprised to see the railways fenced with nothing else than a hedge, where, above all other places, a thorough fence is imperative.

Nothing is better than a good well-trimmed hedge. It adds

beauty and variety to the landscape. The white thorn blossom is worthy of all the praise the poets bestow. In summer it is refreshing to the eye, and in winter it affords shelter from the cold blast, for it will be observed the beech leaves remain on a hedge long after those on the beech-tree are gone.

Unfortunately, in the Highlands and Lowlands of Scotland the soil and climate do not suit a hedge so well. Indeed it may be questioned if it is not a more common operation to be seen at the present day rooting out an old hedge than planting a new one, so far as the agriculturist is concerned. In some places, especially in England and Ireland, the fields and enclosures are too small, and it is a decided improvement to have them made larger. Where hedges have been planted in very inconvenient places, or where they are crooked, as they unfortunately are in some places, or where they have served their day, whether from old age or neglect, or both, their utility may be questioned,—it may be advantageous to have them displaced.

We have seen a hedge running in an inconvenient direction half-way through light and then through heavy land. These two kinds of soil require different methods of cropping, yet owing to the fence this cannot be carried out advantageously. Now it will be easily seen were the fence placed in a situation to divide the light from the heavy land, as can sometimes be done, it would be no small advantage.

Then it is difficult to see why our fields should not be more rectangular, which would make them more expeditiously wrought, and do away with short turnings or points, as the ploughmen call them; and if one side should be along a river or along a roadway, where they cannot always be straight, yet there are three sides left.

In many places along the older constructed lines of railway in Scotland, especially in high cold districts, hedges will be seen utterly useless, where a sufficient fence is absolutely necessary, and consequently they have to be supplemented with a wire or paling fence, and thus are more trouble to keep up, as there are two instead of one.

In the districts where the soil and climate are good, considerable stretches of hedges may be seen without any gaps, but patches do occur, which always spoil their appearance, and these get more frequent as you approach higher ground, till it becomes the merest apology for a hedge.

These instances will serve to explain the position of the agriculturist regarding hedges. Moreover, it must be borne in mind that the roots of hedges extend a considerable distance sometimes, and so abstract nourishment from the soil. Besides, thorn hedges are a disadvantage where sheep are grazing; for on coming to close quarters, both the sheep and the hedge

suffer. The wool may be seen sticking to the hedge, and at odd times the thorns are to be seen sticking to the sheep. But notwithstanding these disadvantages, we would be sorry to see anything else substituted for hedges in many places—on roadsides for instance, or wherever they add much to the beauty of the fields or are required for shelter.

Forming Hedges.—Not much need be said about the methods adopted for planting a hedge, as these are generally pretty well understood. But one thing strikes us very forcibly on looking at many fences of this description,—they seem to have been too thinly planted at first, and too little allowance made for so many of the plants dying out.

About 10 inches between two plants has been recommended, but except in very good soils and climates this is too wide. Some very good hedges are planted with beech and thorn alternately every 6 inches, and in high districts as close as one plant in every 4 inches. Some plant them one of beech to two, and sometimes three of thorn, and sometimes thorn plants alone are used.

From a railway company in England, which is at present rapidly extending its system, the writer received the following, which is the method they now adopt: "The quicks are of white thorn, of not less than three years' growth, two years transplanted. They are placed in two rows 9 inches apart, planted eight in a lineal yard, in good soil and properly prepared border. The planting is done between the months of October and February inclusive. The cost, including the preparation of the soil and maintaining for twelve months, is about 6d. per lineal yard. The life of these thorn fences is practically unlimited, and, if well planted and properly cared for, live and continue to maintain themselves for an indefinite period."

This will serve to show the newest methods of planting hedges—although it is right to mention that on the Scotch railways in the writer's district all other kinds of fencing are giving place to iron and wire, at least on newly constructed lines, climate and soil accounting for the difference.

Beech does best generally on light soil, thorn on heavy land, but the best way to determine the kind of plant to use is carefully to ascertain what grows best in the particular place to be planted. This can easily be done in most cases by a little careful observation.

Many old hedges have been planted on earth raised principally from the ditch beside it, the idea apparently being to afford proper dryness, the ditch acting as a drain. This, though very common, is not at all necessary, but it will be found useful where the ditch is required for a proper outlet to drains; and it must be remembered the ditch itself is half a fence. It has

been observed that timber-posts, used to mend these fences, do not last so long as they do on level ground.

Where a hedge is planted on the level, care must be taken, if the ground be not naturally dry, to have it drained, and in any case the ground must be cleaned of couch and other weeds at the time of planting. This is done by trenching a space 3 or 4 feet wide, and from 20 to 24 inches deep, leaving it a little higher in the centre. It will also require frequent cleaning besides training, and in places where stock are grazing a paling or wire fence is frequently necessary on both sides, always on one side, to protect it for the first eight or nine years, till the young hedge is a sufficient fence for itself.

The assistance a hedge requires from other fences at first, the necessary cleaning, pruning, and even manuring, and the annual trimming it requires all the time it is a fence, besides the assistance it so often requires from wire when it grows old, make it anything but cheap in the long-run, and but for their beauty in summer and the shelter they afford, perhaps they would not be so common.

As our prevailing winds, speaking generally, are from the south-west and west, hedges planted for shelter should run in a direction to break the violence of the prevailing blasts; and if they afford the necessary shelter in stormy places from the west winds, they will also on the converse side mitigate the biting east winds in spring.

In the finer agricultural districts, again, as indeed on arable land generally, attention should be paid to the fact that land can be properly ridged and ploughed only up and down the hill, and in these cases the fences should be placed with this idea in view at least.

Timber Fences.—This must be considered the iron age in fencing, as in everything else. Iron, or possibly steel, is certain largely to supersede wood in the erection of fences. Those of timber have one great drawback, and that a very serious one; in fact, from the very day they are put up, it may be said their days are numbered. As every farmer knows, timber exposed in his fences is a very perishable kind of material, and its duration is often shorter than is generally supposed. If the posts are made from small thinnings of plantations of spruce or Scots fir, they cannot be trusted to last more than four years, and they sometimes become useless in two.

If this class of wood is largely used to effect the necessary mendings, and when these are extensive, as often happens in high pastoral districts with hedges, the farmer, except in winter, will hardly ever have the hammer and nails out of his pocket. No one knows what a benefit good fences are unless he has at some time had bad ones to contend with. When cattle are

grazing on both sides of a hedge, it is often submitted to handling it cannot very well withstand, with the result that the plants are damaged, sometimes uprooted, and holes made in the hedge. In such cases it is frequently necessary to have two good strong wires, one along the top and another along the centre, and the gaps made firm with good strong posts.

It is unlucky that the larch, like the potato-plant, has been subject to disease. Indeed the durability of wooden fences is largely bound up with the fortunes of that splendid tree. In consequence of the partial failure of the larch, that class of timber—and it is far and away the best we can grow in Scotland for this purpose—has become rather scarce and dear. Whoever can discover a satisfactory cure for it will deserve well of his country.

Not only is the wood of the larch the most valuable we have for fencing, but the tree itself will often be seen ahead of all the others in our plantations. Indeed it appears to grow faster than any of them. To obviate the difficulty, some have it planted along with spruce and Scots fir, and when disease manifests itself the larch-trees are thinned out, and by this time they are frequently large enough to be used in fencing, although these young trees never attain to the quality of fully-matured larch.

The writer knows one sheep-farm that was all fenced with larch posts and wire about 1866, and with a good deal of cobbling towards the end it stood out the lease of nineteen years, although it was in reality ready for renewal by the sixteenth year. In another case a good larch fence, erected in 1877, had to be re-erected with new larch posts fourteen years later. The larch was obtained from good old trees, and some of the posts were quite useless and others wonderfully fresh, just as they happened to be made from the red wood or other parts of the tree. Another larch fence, put up in 1880, was down in 1890.

These may be regarded as typical cases, so that it will be seen a good larch fence cannot be expected to stand a nineteen years' lease without repairs, at least, and thus the word "permanent" cannot well be applied even to the best timber fence.

Preserving Wood for Fencing.—If the posts are slightly charred where they come in contact with the ground, and when hot dipped in coal-tar, it serves to make them last longer, especially if the wood has not much resin in it. Then they may be creasoted—that is, placed in a large tank immensely strong, when creasote is injected by means of a very high pressure, sometimes as much as 180 lb. per square inch. Paling posts 4 feet 6 inches in length can be creasoted for 1½d. each;

and this fact is worthy of the attention of those intending to erect fences, especially if they are near the works. A considerable distance would entail expense for carriage.

Wire Fences.—A great variety of wire fences may be seen, all the same in principle, but varying a little in details. Some have the wires drawn from one wooden post to another, and fixed to both with no gearing to tighten them, which eventually slacken through the influence of so many changes of temperature and other causes, when they have to be loosed from the post and drawn anew. This may be convenient at the time, and possibly for a temporary fence; but a little outlay in the case of a permanent fence, so as to afford the means of tightening the wires, will be highly beneficial, and it will be found to last longer. The most common way of doing this is by ratchets attached to the winding-pillars or straining-posts, by means of which the wires can be either drawn up or slackened as may be required. These may be put in at the rate of eight per mile, and made to draw from both sides—that is, each ratchet will have 110 yards on either side to keep tight.

It is very important in the case of wooden posts that the thickest part of the wood should be at the ground; indeed, if the timber were sawn so as to render that part doubly strong, which is so often alternately wet and dry where it comes in contact with the ground, it would be a great benefit.

About 2 yards is a very common distance between the posts, and the number of wires may vary from five to seven. If exceptionally strong posts are put in considerably wider—say another half more—this will necessitate a short post put in between, to keep the bottom wires from spreading too much, in the case of sheep or lambs attempting to go through.

Six is a very common number of wires on a farm fence where both sheep and cattle are kept, and will be found to answer the purpose admirably if maintained at the proper tension. A five-wire fence may often be seen where sheep only are kept, in which case it is not necessary to have it very high—say, 3 feet.

A great number of farm fences vary from 3 feet 2 inches to 3 feet 6 inches, and this height will be found generally to answer the purpose very well if they are always firm; but if they have a railway for their boundary, they are put up from 4 feet to 4½ feet.

A very cheap temporary fence may be erected when cattle only are kept by putting in the posts 6 or 7 feet wide, with three wires, the first and third plain and the middle one barbed.

Barbed Wire.—But barbed wire will be found a disadvantage where sheep are kept; indeed, if not properly placed in the fence it will be positively barbarous for both sheep and dogs.

Some sheep-farmers object to it altogether; and it must be borne in mind that it is illegal to put it up along rights-of-way, or even on roadsides, if not properly protected. Upon inquiry, the writer was informed that no prosecution would follow if put up within or along the top of posts which were driven into the ground 1 foot apart on the roadside, and it has accordingly been done in that way. The main thing to be kept in view is to have it placed in such a way that no one passing or in the way of his duty can suffer by coming in contact with it; and considering that, not much fault can be found with the law.

But barbed wire will often be found very useful. Cattle, even when kept under good hygienic conditions, will be found rubbing themselves against posts, and in this case the strain comes on that part least able to bear it—that is, at the ground—which partly accounts for many wire-fences, especially if an inferior class of timber has been used, lasting so short a time. Barbed wire will come in useful here, but it must be used with discretion—though it has been the writer's experience that fewer accidents to stock occur with than without it, young stock and dairy cows, after a little experience, being inclined to keep at a respectful distance. Barbed wire is perhaps more dangerous for horses than for any other kind of stock. But all the same it certainly has its uses: it will often give the necessary staying power where the fence is not good, and where it is a little shaky, and it will enable an ordinary wire fence to last longer.

Portable Wire Fence.—A very good kind of portable fence has been invented by Mr Walker of Heriot. It is composed of six steel wires, which are stapled to light strips of wood $1\frac{1}{2}$ inch square, one every 6 feet. A post is put up every 8 or 10 yards. It is easily attached and easily shifted, and will be found a great benefit where sheep only are kept, and also useful in rocky places, as fewer posts in the ground are required. It costs, exclusive of posts, slightly under 2½d. per lineal yard; and some have not hesitated to say that with a barbed wire along the top it would do for cattle also, but the wisdom of trying this experiment, if oats or turnips were growing on the other side, may be questioned.

Post-and-Rail Fences.—Post-and-rail fences are more expensive than wire fences, and do not last so long, but in exceptional cases may be useful—as, for instance, where wood is plentiful and far from a market. It must be observed, too, that some breeds of stock are more difficult to keep on their ground than others—the blackfaced breed of sheep, for instance, being more inclined to roam. Cattle confined to pastures where crested dogtail is plentiful, which necessitates the grass being closely cropped in early summer, must be well fenced; and in all cases

it is profitable never to allow stock to get off their proper ground once, for they are less easily kept in afterwards. Indeed young stock brought up among bad fences will generally be a nuisance ever after.

Iron Fences.—It is certain that iron will enter more largely into the construction of farm fences than heretofore, as those composed of iron are the most durable, and possibly the most satisfactory in the end. These are put up in a variety of ways. One objection to some methods is that they entail a considerable amount of labour at the time of erection, running into stone blocks, and in most cases a good deal of digging besides, and it is slow work putting up any considerable length.

What the writer considers a very superior kind of iron fence is now being erected near at hand. The standards are of bulb tee-iron, fully 17 lb. each, capable of allowing the top wire to stand 4 feet high, and the standard itself to be 2 feet in the ground. Instead of being forked, a simple earth-plate of galvanised iron, 8 inches broad, is fitted on and made fast with a wedge. With this complete, each standard will weigh about 20 lb. This part goes in the ground, gives the necessary resisting power to pressure from either side, and thus the standard is as easily put up as any wooden post. The seven wires are of best seven-ply galvanised wire, and it can be put up for 1s. 6d. per lineal yard, including painting and all other costs. If considerable stretches of it were contracted for near the works, and the ground free from rock, it might be done for a trifle less. Moreover, as farm fences are not always 4 feet high—indeed 40 inches is a very common height, and even railways are fenced with iron standards less strong and massive than those in the specifications for the fence above-mentioned—it follows that if a demand were created, a good iron fence with six wires might be put up for 1s. per lineal yard, so that not much objection can be taken on the score of expense. A larch-post fence with strong rails will cost as much, and even one with wires will not cost much less. In the latter case there will be less charge for interest for the first fifteen years; but after the re-erection of the timber fence it will be found that, with the low rates of interest such as those ruling at present, if one look at it from a financial point of view, the iron fence is much cheaper in the long-run, does not necessitate the trouble of being taken down and put up again several times in a lifetime, and may always be calculated on to do service. But a larch-post fence will likely continue in favour, especially as on many estates the material is always at hand, and may be some distance from the market.

Stone Fences.—In districts where good stone is plentiful—often lying to hand, and perhaps in the way—there need be no hesi-

tation in deciding what material the fence is to be composed of. Good stone dykes have many excellences. Indeed no ordinary kind of farm fence the writer has used has given as much satisfaction. The repairs needed were infinitesimal compared with those required by thorn or wire fences; and when any rebuilding was rendered necessary, the old material was always at hand, and as good as ever.

Even in favoured places the carting for stone fences will entail a great amount of labour and expense, but, with the stones laid down, a 5-foot drystone dyke can be put up for 1s. a-yard; and if the carting of stones could be arranged to take place at times when the farmer's men and horses can be best spared, the extra labour might not be felt so much. A good time for this on many farms will be in the month of June, usually a dry month, when the turnips are all sown, or even during the time of frost.

A stone dyke of the kind indicated, properly built, with good attention paid to the foundation, will last a very long time, and be a considerable acquisition for shelter. Care should be taken that no water is allowed to run through among the foundation stones, for the alternate process of freezing and thawing will bring down the dyke; and sometimes careless persons waste a good part of a dyke taking out stones to get at rabbits.

Stone and Iron Fences.—Stone dykes are also built much lower, and one or more wires put along the top,—a very useful precaution, especially where sheep are kept. A good fence may be put up $3\frac{1}{2}$ feet, or even 3 feet, with iron standards every 4 yards forked and sunk slightly in the ground, then built up with the dyke to hold two wires along the top. The writer has used a 3-foot stone dyke of this description with iron standards and wire put up in this way, and could desire nothing better for any ordinary purpose.

Of course, if shelter is intended, that is a different thing. It has been found unsatisfactory to have the iron standards short and only sunk into a stone at the cope, unless it were built with stone and lime, as with a drystone dyke they are apt to tumble over.

Even lower fences of stone are frequently built and the difference made up with extra wires; but if all kinds of stock are allowed access to them, they will be better, if much lower, to be built with stone and lime.

A properly built and situated iron and stone fence combined will be found always very satisfactory. If lime be used, they are certainly more durable, though at the same time much more expensive. Some are merely built dry and then pointed with lime, but the cope is bedded and fixed with lime, thus rendering it more durable and not so much subject to injury.

Lime for this purpose should be of good quality, and should always be bought and sold under some form of guarantee, as in the case of manures. In large contracts for Arden lime this is done, a mould of it being cast, which, after a certain number of hours, is guaranteed to bear a certain strain.

Other Fences.—Turf fences may in mountainous districts be put up for shelter.

Sunk fences are often useful, and in certain cases can be much improved by planting quicks about a foot or so from the top between a layer of stone. The thorns grow upward, and soon render it almost impervious even to persons attempting to pass.

Stone dykes with earth facing and wires along the top may often be seen by the sides of plantations, and answer the purpose very well.

Ornamental wood or iron fences around gardens or dwellings, the deer-fence, or the high stone wall round the demesne of the nobleman, hardly fall within the scope of farm fences.

CALVING AND FOALING.

BEING NOTES ON THE DISEASES OF DAM AND OFFSPRING
OCCURRING DURING AND IMMEDIATELY AFTER PARTURITION.

By WILLIAM WILLIAMS, F.R.S.E. and F.R.C.V.S., Principal of the New Veterinary College, Edinburgh; and W. OWEN WILLIAMS, F.R.C.V.S., F.R.P.S., Professor of Cattle Pathology, ditto.

THE COW.

It is not possible in a short article like this to state all the facts that it is necessary for one to know so as to prevent or relieve the numerous diseases and mishaps which threaten a calving cow. Perhaps it will be well to mention some of the evil practices which are in vogue with dealers.

Chills.—Firstly, many dealers wash calving cows, and then expose them for sale. It is easily understood that this practice is very apt to give the cow a chill, which may affect the womb or the udder and cause inflammation and even death. In many cases the cow shows no signs of disease until the next day, and the buyer has all the annoyance and expense of treating it, as well as the loss of milk.

Injury in Trucks.—Another bad practice is to truck cows from one place to another immediately after or just before

calving—in fact, they sometimes calve in the truck. Such should not be permitted, as not only is it cruel but it tends to induce disease.

Cleansing.—Again, when one buys a cow it is usual to ask, Has she cleaned?—that is, Has the afterbirth come away? Unfortunately, the answer is not always truthful, for the seller not being able to remove the afterbirth, or not having the time or inclination, simply cuts off what is seen as short as possible, and the remainder stays in the womb, and is apt to putrefy and cause disease.

"Dropping."—A common disease is what is known as "Dropping after calving," or apoplexy. This usually occurs in cows at their third or fourth calf, and in those which are known to be good milkers and are kept in high condition. Many cases may be prevented by following this advice: give all cows exercise for some weeks previous to calving; reduce the feeding, and for a fortnight keep the bowels in an extra loose condition by giving sloppy food with treacle, or small and frequent doses of salts.

It unfortunately happens, however, that the disease will come on in spite of all precautions,—sometimes immediately after calving, or at the outside within three days. It is more to be feared when the calving has been an easy and rapid one.

The first symptom noticed is that the cow is uneasy, and paddles with her hind-feet, and that the flow of milk suddenly ceases. Then she becomes excited—may even be dangerous. This excitement, however, only lasts for a short period, and is succeeded by sleepiness. She will lie down, and will place her head on the trough in front of her, or will turn it to her shoulder; but in whichever position it happens to be placed, it seems to be fixed there, and the neck becomes more or less rigid. By this time the breathing becomes slower and deeper, and she snores. If she be touched, even pricked with a pin, there is little or no sign of pain. The eyes are sometimes noticed to be wide open, and the pupils are distended. There is a tendency to lie on the side, and the stomach to become distended with gases, which may occasion such pressure on the lungs and heart as to cause death. There is no passage of dung or urine, nor is there any flow of milk. In many cases the temperature is much elevated, even up to 108° F. In others it may be normal, or even under normal. These latter cases have a much better chance of recovery than the first-mentioned. In some cases the tongue is small and hard; in others, again, it is large and soft. The first are usually fatal.

As a rule, the climax occurs in about twelve hours from the onset of the disease. If the termination is going to be favourable, the breathing becomes more normal, and sensibility gra-

dually returns, and the cow will move her head, to show signs of returning consciousness, a desire for food, to make endeavours to rise, and the flow of milk will return. If the result is to be unfavourable, the sleep becomes deeper, the snoring increased, the breathing heavier and terminating in death. As to treatment, almost all the medicines known have been tried, occasionally with success; but no one or combination of several has been found to be specific. There are, however, certain things which must always be done. Firstly, place the cow in a comfortable position—that is, get her to rest on her chest, and do so by placing straw or bags of sawdust, &c., at her sides, so as to keep her from slipping; draw off her urine, and remove the dung from her end bowel. Some recommend that the udder should be stripped every few hours; others say, Leave it alone, as, if it can't secrete milk, why bother it? Leaving it alone is the better plan. Seeing that the disease is a brain one, the general treatment is to diminish blood-pressure, to keep the head cool and the body warm.

"Flooding."—The next condition to be dealt with is termed "Flooding." This comes on immediately after delivery of the calf, and is recognised by the expulsion of blood, both fluid and in clots, at each afterpain. It is a disease which must be attended to at once, or the cow will die of hæmorrhage. The usual cause of it is a too rapid separation of the afterbirth from the womb just after calving, and, in consequence, the blood-vessels of the womb, losing the support they had, tend to permit the blood to escape from them. This blood gradually fills the womb, and quantities of it are expelled at each strain.

In addition to the above and most important symptoms, the cow will be noticed to be extremely exhausted, her tongue and mouth will become cold, her pulse weak, and her breathing rapid.

The general treatment is to give a sedative to stop straining, to apply cold to the back over the loins, and cold and astringents to the passage, but on no account to remove what clots of blood may be in the womb, as they always help to stop the bleeding. The day afterwards the womb may be washed out with an antiseptic solution; and if there should be any bad smell, the washing out must be done daily until the smell disappears. As regards other treatment, the cow must have extra good food, to help to make up for the lost blood, and to assist in getting up her strength again.

Retention of the Cleansings.—The next common condition is known as "Retention of the cleansings." The cow is said not to have cleansed—that is, the membranes which covered the calf have not come away. This is recognised usually by seeing a mass of greater or less size hanging from the vulva,—this

mass having a torn appearance, and tending to putrefy rapidly; in fact, if it be not cast off within a few hours it commences to smell.

It is always advisable to remove it, or else some of the putrefying matter will get into the system of the cow, and she will show signs of blood-poisoning. Some people, to remove it, attach a weight to the end of it; but this is a most barbarous thing to do, as the weight causes the cleansing to press upon the mouth of the bladder, and so prevents the cow from passing her urine. The best way to remove it is to take two pieces of wood—say two pieces about half an inch thick and two feet long—place one piece against the under surface of the cleansing, and the other piece on the upper surface, making a sort of clamp of them, then slowly turn them round, and really wind the cleansing round them. Great care must be taken that the operation be not performed too hurriedly, or else the cleansing will break off internally, and give further trouble; but if proper care be taken, in most cases it will gradually come completely away.

In some cases, however, in spite of all care, it will break, and then the operator should pass his hand and arm (well smeared with carbolic oil) into the womb, and carefully disentangle the portion which can be felt attached to the buds inside.

The after-treatment should be to wash the womb out with some warm water containing an antiseptic, and to give internally antiseptic medicine.

It frequently happens that a portion of the cleansing remains in the womb and putrefies, with the result that the cow becomes seriously ill. She goes off her food and her milk; her pulse becomes much accelerated; temperature elevated to 104°-106° F., sometimes even higher. She blows—that is, her respirations are increased—and there is a discharge of bad-smelling fluid from her womb.

In such cases the womb should be syringed out with an antiseptic solution every day, or even twice a-day, till recovery. The cow should receive good food and tonic medicines; but on no account should she receive a purgative drench, as that would tend to increase the absorption of the poison, and so increase the danger of death from blood-poisoning.

Eversion of the Womb.—Another untoward termination of parturition is “eversion of the womb,” or “putting out of the calf-bed.” The cause is irregularity of the spasm, or contraction of the womb when the afterpains are on; in reality it is due to one of the corners of the womb dropping in, and assuming a condition like the fingers of a glove when the glove is pulled off hastily and its fingers become more or less turned inside

out. Once this condition starts, it rapidly proceeds until the whole of the womb may be turned inside out, and hang as a huge dark-red mass from the vulva. The womb is easily recognised from other bodies, as it is covered with what are known as cotyledons, these being fleshy masses rather like deep red roses, and vary in number, usually about 100 to 200.

The first thing to do as regards treatment is to stop the straining, by giving a dose of sedative medicine; next, place the cow in such a position that her hind-end is higher than the fore-end. This may be done by making the bedding high behind. Then take care that she cannot lie down nor throw herself to the right or left.

While all this is being done an assistant should thoroughly cleanse the womb of bits of straw, remains of cleansings, &c., by bathing with warm water and milk, or warm water and carbolic acid, or Condry's fluid. After this is finished, the womb should be placed on a clean cloth or sheet, and lifted up so as to be opposite to the vulva. It usually requires two assistants, one on either side, to do this properly. Once in position, the operator must, bit by bit, gently press the womb back again through the vulva; often, when about half is returned, the rest will commence to follow with very little pressure. On no account must the operator cease his efforts, but must permit his hand and arm to follow the mass through the vulva, and keep them there for a few minutes, as in many cases no sooner is the womb returned to its normal position than the cow gives a great strain and re-expels the mass.

It is well to caution the operator on no account to attempt to return the womb during strains. When the cow strains, the operator should offer a passive resistance only.

Once the womb is returned, and the operator has removed his arm, a truss must be applied to the vulva to prevent the cow from again expelling the womb.

As regards other treatment, quietness, light food, and sedative medicine if any reappearance of straining.

A cow that has once done this is very apt to do the same at the next calving; and so it would not be advisable to breed from her again, unless she is a pedigree beast.

Second Cleansing.—A week or ten days after calving the cow's womb has almost come down to its natural or non-pregnant size, and in consequence of this contraction there is a considerable portion of its inner lining cast off. In addition to this, there are numerous little blood-clots from the vessels, and a certain amount of slime, all of no further use, and in consequence these are cast out from the womb as a dirty-coloured thickish fluid, known as the second cleansing or lochea.

This discharge continues for a few days, and after it is all

away the mouth of the womb closes up until the cow comes a-bulling again. In some cases, however, the mouth of the womb tends to close too rapidly, the discharge is retained, it putrefies and becomes absorbed, giving rise to fever, loss of appetite, diminution in the secretion of milk, &c. In all these cases of illness about this time, care must be taken to inquire whether or not the second cleansing has come away. In some cases the vagina becomes dark-coloured, and there is a little discharge, which is bad smelling. Unless the animal be treated the lungs will become diseased, the breath foetid, the animal become paralysed behind, and ultimately die.

The general treatment is irrigation of the womb with antiseptic solutions, and the internal administration of antiseptics and tonics. It is not advisable to give a purge, as that is apt to promote absorption of the putrid matter.

THE MARE.

The mare generally foals very quickly, and, provided the foal be in its proper position—namely, with the fore-feet and nose presenting—should not hurriedly be interfered with, as the introduction of the hand or other foreign body into the passages of the mare is not unfrequently followed by grave consequences, no animal being more susceptible to blood-poisoning after parturition than the mare. If the foal be in proper position, and the labour seem protracted from the foal being a large one, or the dam small in comparison, or at the period of first foaling, gentle traction might be necessary; but in doing even this, care should be taken not to introduce the hand oftener than necessary, nor into the passage at all if a grip can be obtained of the foal's feet or legs. If it be necessary to introduce the hand, the person should pare and clean his nails, and wash his hands and arms with carbolic soap and warm water, before doing so.

Sometimes the foal presents the tail and hind-legs first—breech presentation—and sometimes the hind parts will protrude through the passage and the foal stick fast just behind the shoulders. When this occurs no time should be lost in assisting the delivery, as then the circulation between dam and offspring will be cut off, and the foal will die from suffocation.

Cleansing.—As a rule, the cleansing is expelled very shortly after the birth of the foal, and if this be the case there should be no interference, although slight afterpains might continue for a few hours; but should the cleansing or afterbirth be retained, it should be removed by hand within the first twenty-four hours

after the birth of the foal. Nothing is so fatal to the mare as a retained afterbirth, for, rapidly undergoing putrefaction, it causes extreme irritation of the womb, manifested by endeavours to expel that organ, as evidenced by painful and frequent straining, during which efforts a coffee-coloured foetid fluid is ejected. This irritation soon causes congestion and inflammation of the womb itself; its blood-vessels become filled with blood, which often congeals—coagulates—within them; the fluid portions of the broken down and putrid products of the decomposing cleansing gain entrance into the blood circulation, inducing an excessively severe fever, the temperature of the body rising five or six degrees—viz., from about 101° F. to 106° F. or higher. The animal now becomes exceedingly restless, and in addition to the agonising afterpains, she gives signs of pain in the bowels by lying down, rolling, looking round to the flanks, and other signs of colic. The breathing becomes very hurried, the pulse small and rapid, and in some cases thrilling to the touch; the bowels are generally torpid, and in many cases the feet become inflamed, and the animal is now suffering from a complication of inflammation of the womb, blood-poisoning, and inflammation of the bowels and feet, from the action of the putrefactive matters upon the blood and organs, and finally the lungs become congested, and if relief be not very quickly given the mare dies in great agony.

In a case of this kind the first thing to be done is the removal of the afterbirth, and for this purpose the hand and arm must be first disinfected. The womb itself should be irrigated with carbolic solution, Condyl's fluid, or a weak solution of corrosive sublimate, 1 to 1000. Then the cleansed and disinfected hand and arm are to be introduced into the womb. The afterbirth is then to be carefully removed by being separated from its attachment to the womb. Plenty of time should be taken over this removal, and if possible no vestige of the membrane should be left. If the mare strains violently it may be necessary to administer an opiate, or to put her under the influence of an anæsthetic—chloroform or chloroform and ether; and when the operation of removing the cleansing has been completed, the womb is to be again thoroughly washed and irrigated. If pains continue, the opiate might be repeated, and some laudanum mixed with carbolised oil injected into the womb. We consider that carbolised oil is the best disinfectant to inject into the womb after it has been thoroughly cleansed, as the oil adheres to the surface of the organ, and enables the disinfectant to remain longer in contact. One part of pure carbolic acid to thirty of best sweet oil is the proper mixture.

If symptoms of fever have already appeared the mare's shoes should be at once removed; for if this be delayed until "founder" has actually occurred, it will be a matter of great difficulty indeed, even an impossibility, without causing great annoyance and irritation to the patient. When the shoes have been removed and the wall of the foot rasped down to the level of the sole, the feet should be placed in warm poultices,—and boiled turnips, when obtainable, make the best of poultices for all veterinary purposes,—the animal comfortably bedded, and thus induced to lie down. There must be no continual interference on the part of the attendant, as absolute repose is of the greatest importance. As the further medical treatment of this dangerous disease can only be undertaken by a veterinary surgeon, the above are simply directions as to what ought to be done pending the arrival of the professional man.

Eversion of the Womb.—Eversion of the womb, the surface of which is smooth in the mare, is a comparatively rare occurrence, but is attended with difficulty and great danger; for very shortly after expulsion it begins to swell, its vessels become engorged, its coats become congested, rendering it very difficult to return it to its proper position.

The preliminary steps towards returning the organ should be—1st, to fasten the mare with hobbles or ropes so as to prevent her from injuring the womb by rising and falling, as she often does, from the pain she feels; 2d, to remove any remains of the afterbirth that might remain attached; 3d, to wash the whole surface of the womb with warm milk and water, containing some carbolic or other disinfectant; 4th, if the straining is excessive, to place the mare under the influence of chloroform, and finally to return the womb into its proper position; and in order to do this, it may be necessary to elevate the hind quarters of the mare by placing bundles of straw under the hips and hind legs.

Before attempts are made to return the womb, if it be very much swollen, bathe it freely with warm milk and water in order to reduce the swelling; and if this is not sufficient, the surface might be slightly scarified so as to allow the escape of the blood from the congested vessels, and thus allow the swelling to subside. When the swelling is reduced the womb may be returned, and for this purpose the closed hand (the fist) is to be placed against its very centre, and the womb pushed in with steady but not forcible pressure. If the mare be under the influence of an anæsthetic there will be little or no resistive efforts on her part, but if not under this influence pressure must not be used except during the intervals between the throes.

DISEASES AFFECTING THE YOUNG SHORTLY AFTER BIRTH.

Disease of the Navel-string.—This disease, called *omphalitis*, or inflammation of the umbilical cord, is seen in young animals, particularly foals, a few days or a week or more old.

In many instances the first noticeable symptom of this condition is a dribbling of urine from the umbilical cord. The urachus, at first impervious, has again become pervious, allowing the urine to escape, although the urethra is quite in a normal condition, the animal having been seen to urinate in the natural manner. In some instances the above symptom may be preceded by great restlessness, colicky pains, a tendency to lie upon the back, pain evinced when the umbilicus is pressed upon, some swelling of the parts, and a doughy feeling, with constipation of the bowels and rapid prostration. In other instances the first noticeable sign may be lameness in one or more limbs, with swelling of one or more joints, considerable fever, accelerated respiratory movements, &c.; whilst again all these symptoms may be almost simultaneously manifested.

The nature of the disease was first described by Bollinger, who found that the arthritis, or inflamed joints, is due to the condition of the urachus, and the treatment should be directed to that condition; and the experience of veterinarians in this country has confirmed this view.

The causes are sometimes very obscure, but any ordinary cause, such as cold, and particularly "damp cold," may induce it. Being kept in ill-drained stables will cause it; and it has been observed that, when mares and foals are pastured in fields that have been lately dressed with bone manure, the foals are very apt to suffer from this disease. The application of a ligature to the umbilical cord—a reprehensible practice—particularly if applied too close to the abdomen, is another cause of the disease.

Any and all of these causes induce inflammation in the remains of the umbilical vessels, artery, vein, the navel-string, which soon assumes a septic nature. The septic products which are absorbed into the circulation cause the inflammation of the articulations and bones; and it is now found that the most successful method of treating it is to excise the remains of the umbilicus close to the floor of the abdomen, remove all *débris* of blood, &c., contained in the surrounding tissue, dress antiseptically, and, if there be colicky pain, freely foment the parts, and give an opiate. The excision of the cord is necessary whether the urachus remains patent or not, and is to be performed in all cases where the abdominal pain or joint affection is associated with heat, swelling, or tenderness of the umbilical

region. If there be constipation of the bowels, enemata containing a teaspoonful of glycerine are advisable.

Lambs under five days old are also subject to a fatal disease called "Black Spauld," arising from the absorption of septic—putrefactive—products into the system from the navel-string, and when this disease breaks out in a flock it spreads with great rapidity. If the weather be very cold, and particularly damp and cold, the disease may arise independently of contamination—the depressing effects of the weather preventing the obliterating process, which naturally seals up the navel-string after birth, taking place; consequently its contents quickly putrefy in the hollow or tube of the string, and are from thence absorbed into the blood, poisoning that fluid, and causing speedy death. When examined, these lambs present a large patch or patches in the skin, particularly about the shoulders and fore quarters, of a dark purple colour; and if the blood from these patches be examined microscopically, it is found to be swarming with the bacteria of putrefaction. If there be no sign of this disease when the lamb is five days old, experienced men state there is no danger; and this can be accounted for by the fact that the navel-string has become dry and the tube obliterated about this period. When this process is accomplished there is no further danger of foetid matters gaining, in this way, any entrance to the system.

Another great cause of this disease is want of attention to the cleanliness and purity of the "lambling buchs" or sheds. Very often the afterbirths are allowed to remain in the bedding, and these undergoing putrefaction contaminate the whole surroundings; and then the skins of sheep which perhaps have died in lambing, or from inflammation subsequent to that act, or which have died or been killed weeks or even months previously, are suspended on rails under the roof of the shed, rendering the atmosphere a source of septic contamination, which readily enters through the tissues of the young navel-string.

We are of opinion that when this disease breaks out the shepherd should be changed for a short time, as undoubtedly he becomes a carrier of the taint; and if the weather permits, the remainder of the flock should lamb outside.

If lambs outlive the first shock of this disease, they are very apt to have joint-ill, from which they too often die or remain worthless cripples.

The causes of this disease being indicated above, its prevention, to some extent at least, may be effected by attending to the removal of such causes; and here, as in the case of foals, strict attention to cleanliness, purity of the atmosphere, and to keeping the animals dry and comfortable when possible.

The practice of *tying the navel-string* cannot, in the opinion of the writers, be too highly condemned, unless indeed there be bleeding from it after the young is born, as, in the first place, the string or worsted which is generally used often contains contaminating bacteria, and is thus the direct cause of the blood-poisoning; secondly, it prevents the natural drainage of the first fluid contents of the navel, which, accumulating in the canal, soon undergo putrefaction, and are another of the causes of the blood-poisoning.

When, however, it becomes imperative to stop any bleeding from the navel, it is better to do so by twisting the string, or, if a ligature be necessary, it should be of properly prepared catgut; but if this be not available, the material, whatever it might be, should be dipped into a carbolic or some other anti-septic solution.

Septic congestion of the womb in the ewe is commonly known as "*inflammation*." It is due to similar causes as the same condition in the mare and cow, and is amenable to the same kind of treatment.

In conclusion, it may be stated that if attention to cleanliness and sanitation is neglected at the period of parturition, both dam and offspring are subjected to risks which may induce disease, and even death.

THE BLACK ARCHES, "NUN," OR SPRUCE MOTH (*LIPARIS' MONACHA*); ITS LIFE-HISTORY AND SYLVICULTURAL IMPORTANCE.

By JOHN NISBET, D.Oec., 145 Norwich Road, Ipswich.

THE scientific names, which are synonymous with the generally accepted one given above, are *Phalæna monachu*, as it was originally named by Linnæus; *Phalæna Bombyx monacha*, or *Bombyx monacha*, Ratz.; *P. silura monacha*, Stph.; and *Oencria monacha*, Hbn.¹

DISTRIBUTION.

The spruce moth has been found over nearly the whole length and breadth of Europe, wherever conifers occur either in

¹ The photogravure plates are reproduced by kind permission of Dr von Tubeuf, editor of the 'Forstlich-naturwissenschaftliche Zeitschrift,' by whom the original photographs were taken.

pure forests, or form the ruling species with broad-leaved deciduous trees merely intermixed. From Scotland and England eastwards to Asia, and from Upsala and St Petersburg southwards to Corsica, it is liable to make its appearance in greater or less numbers, occasionally swarming in such enormous strength as to devastate completely the coniferous forests which form the grazing-ground of the various caterpillars. On the whole, it is of less frequent occurrence in western and southern Europe than towards the east and the north, especially in the vicinity of the Baltic sea.

Although preferring level tracts and the uplands or lower hilly regions, it is found in the higher mountain-ranges as far as the beech ascends; but its worst devastations are usually caused at the lower elevations. Every now and again it begins to increase in numbers, and then in a few years it develops into the most destructive of all the insect enemies of woodlands, especially of spruce forests,—for spruce has much smaller reserves of starchy and nitrogenous matter, and consequently less recuperative capacity, than most other trees.

It has been known as periodically destructive in the forests of Germany, France, Russia, Austria, Switzerland, and Denmark since the fifteenth century; but whilst occurring locally in parts of Great Britain, feeding on many species of trees and shrubs, it can never yet be said to have caused injuries of any very serious character.

DESCRIPTION.

1. *The Imago or fully-developed Moth.*

General appearance (see figs. 1, 2, 3, and 4).

With its white fore-wings and their zigzag pencilling, its greyish back wings, and its black and white abdomen tinged with bright rose-colour, this beautiful moth is easily recognisable. The male is smaller than the female, and has a somewhat flattened abdomen, with a broad brush-like tuft of dark hairs at the extremity, whilst the latter has a much larger and more cylindrical development of the abdomen, which terminates in a long pointed ovi-depositor.

The moth flies by night at the end of July or the beginning of August, chiefly in old coniferous forests, the female depositing the small convex ova in small clusters under the scales of the bark, or under lichens. The eggs do not open till the advent of warmer weather in the following spring, when the young larvæ come out about the end of April or the beginning of May, remaining for a short time in schools or clusters before ascend-

ing the stems to feed on the foliage until towards the end of June. The full-grown greyish-yellow or greyish-green caterpillar is easily recognisable through its longitudinal rows of dark warts with sparse tufts of hair, and its characteristic dark stripe down the centre of the back, interrupted by a lighter patch on the whole of the 8th and parts of the 7th and 9th sections.

Although omnivorous in regard to foliage when occurring in large numbers, this insect is chiefly to be found on the spruce and Scots pine among conifers, and on the beech among deciduous trees. When disturbed in their feeding by high winds, swaying of young trees, &c., the younger larvæ let themselves down to the ground by fine threads, which the older

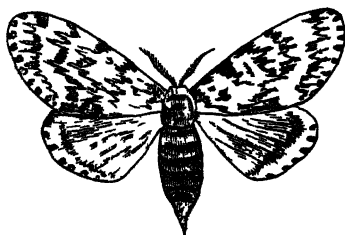


Fig. 1.—The female in flight.



Fig. 2.—The male in flight.

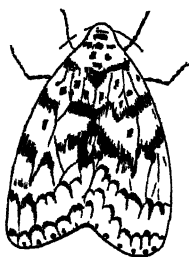


Fig. 3.—The female at rest.



Fig. 4.—The male at rest.

larvæ have no longer the power of spinning; but in either case, whenever they reach the ground, they at once seek out the stems again in order to reascend them, and recommence feeding in the crowns.

Characteristics in detail.

The front wings, which in the male have a full span of 1.32 to 1.80 inches, and in the female of 1.60 to 2.2 inches, are chalky white, or sometimes with faintly brownish-grey tinge, and have four more or less distinctly marked and decidedly zigzag or wave-like dark lines or rows of pencilling, varying

from pale brown in the centre almost to black at the upper edge, where they begin in broad, nearly black, patches. A similar small patch, but generally intensified in its depth of colour, is also situated at the base of the wings. In the female the zigzag markings are less equally distributed over the whole surface of the wings than in the male, being more mixed up and slurred in the middle portion, whilst the three upper lines almost always get finally jumbled and mixed up together to form a darkish brown patch with a very small white eye in the centre. Between the blackish patches at the base of the wing and the first line of pencilling there are usually three to five small dots, whilst along the outer edge of the wings there are generally nine blackish dots, forming eyes or foci of the outer line of black arches, whence its English name. The pencilling is altogether more regular in form on the male than on the female, but in both genders the tone of colour is lighter in the central region of the wings.

When in repose (see figs. 3 and 4), the outline of the male forms an equilateral triangle, in the centre of which the second and third lines of pencilling form a more or less circular patch; whilst that of the female gives rather the general idea of an inverted heart, with a somewhat pointed paraboloid apex, owing to the lower outer edge at the end of the wings being much more obtusely angular.

The back wings are somewhat brownish-grey, with three rows of broadish wavy-lined pencilling, of which the upper two are only faintly traceable on the female, and altogether indistinguishable on the male. The third or outer line is broader, slightly darker, and less wavy in the male than the female. Towards the inner edge of the wings the feathery appearance of the scales is much more strongly developed in the male than in the female.

The head is blackish-brown on the lower side, and slightly greyish-white above, with a narrow rose-coloured or bright red line near its junction with the breast.

The thorax or breast is greyish-white, with black bars and points.

The antennæ or feelers of the female are small, black, and shortly double-feathered, although apparently only toothed; whilst in the male they are longer, richly double-feathered, and greyish-brown in colour, the stem of the antennæ being whitish-grey at the base, almost black towards the middle, and white again at the tip.

The legs of the female are covered with short hairs which form a sort of blackish cuff on the middle section; in the male they are covered with long hairs forming a cuff-like growth of black and white on all the sections.

The abdomen or body differs characteristically in the two genders.

In the male it is thinner, shorter, and not so full or prominent as in the female, but more thickly covered with whitish-grey hairs along its upper half, and ending in a short, thick, broad, bushy wisp of hairs, dark brownish-black at the base and light-grey at the ends. From whitish-grey near the thorax, it gradually becomes rose-coloured, particularly on the 2d, 3d, 4th, and 5th last sections; the upper sections have dark points on each, but becoming fainter as they proceed downwards, till they are merely faint brown patches on the upper portion of the rose-coloured wings, though finally very distinct again, and much enlarged, on the hairy bush at the extremity of the abdomen.

In the female it is much more fully developed than in the male, being longer, thicker, and more cylindrical throughout about two-thirds of its length, and then gradually terminating in a thin mobile ovi-depositor, formed of several rings or sections, which can be projected from or drawn up into the abdomen at will. Near the thorax, the sections of the body are sparsely covered with whitish-grey hairs, which gradually become dark grey towards the lower sections. On the first four rings are black points, which soon become deepened in hue, and spread over the whole of the upper portion of the remaining sections, the lower portions being brightly rose-coloured, except the two final rings which are entirely black. In the centre of the back the black patches are broad, and the rose-coloured ones narrow, but towards the sides the latter broaden, whilst the former diminish in breadth.

2. *The Ova or Eggs.*

These are about half a line in diameter, and have somewhat the appearance of flattened circles, like cheeses in miniature. They appear smooth and shiny to the naked eye, but under the microscope can easily be seen to have a very fine net-like design on the surface of the shells, which, beginning in the centre at the top, forms a sort of rosette round the micropyle, consisting of three to four very fine channels, and is carried on to the sides in larger hexagonal figures. The freshly laid ova are brightly flesh-coloured or lilac, but they afterwards turn bright brown, and finally assume a whitish opalescent appearance, like mother-of-pearl, for about three to five days before opening for the exit of the larva. Four weeks after the deposition of the ova, the larva is completely formed; but it reposes within the shell throughout the whole of the following winter, so that it cannot be reckoned a fully developed larva till it actually makes its appearance.

3. *The Larva or Caterpillar* (see fig. 5).

When it makes its exit from the ovum in spring, this is at first yellowish in colour, but soon becomes greyish, and finally black, with a covering of long hairs till its first shedding of the skin: during this stage of its development it has an initial length of about one line only, increasing to about one-sixth of an inch. In fine weather the larva wanders at once in search of food, but in dull weather it remains for three to five days collected together in schools or clusters before commencing its wanderings.

During the course of nine to ten weeks the larva sheds its skin four times, increasing in size on each occasion gradually up to about two inches in length when full grown; but after the first change of skin it acquires its characteristic appearance, which is only slightly modified during the three subsequent changes.

The fully developed caterpillar consists of twelve rings or sections (exclusive of the head), and has eight pairs of legs or feet, of which the first three, attached to the 1st, 2d, and 3d, or later on the thoracic sections, are sharply pointed and claw-like, and serve principally in holding the foliage whilst the process of gnawing is going on; the 4th and 5th rings are bare; the 6th, 7th, 8th, and 9th have each a pair of long cone-shaped feet ending in suckers, for giving stability during movement or in high winds, &c.; the 10th and 11th sections are again bare, and the final or 12th section has also a pair of sucker-like feet, with which the propulsion of the insect is materially assisted, and the work of the four central pairs of feet aided.

Along the body there are six rows of warts, on which loose tufts of long stiffish hairs are produced; otherwise the rest of the body has no hirsute covering. In the two outside rows below the spiracles or breathing-holes on the footless 4th, 5th, 10th, and 11th sections, there are also additional small hairy warts. The second row of warts on each side is situated just above the spiracles, those on the first section being prominent and cone-shaped. The two middle rows of warts along the back of the caterpillar have black hairs, whilst those forming the two other rows on each side bear grey hairs. The horny

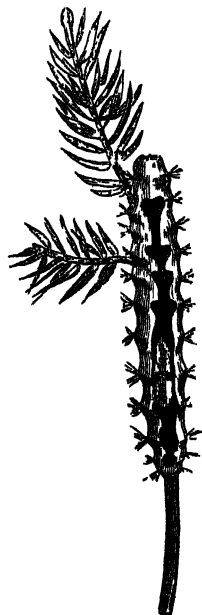


Fig 5. — Full-grown caterpillar feeding on a twig of spruce.

capsule protecting the head varies from whitish to yellowish or greenish, with many small dark spots, and an almost black heart-shaped patch, with the apex towards the back of the head. On the middle of the back of the second thoracic section there is a black, velvety, heart-shaped mark which spreads down, becoming somewhat lighter in colour, along the centre of the back to the 7th section; on sections 4, 5, and 6, it spreads laterally to the dark warts of the central rows, but bifurcates on the 7th ring, and is continued by a thin side-line past the 8th section, uniting again on the 9th, to be continued along the top of the 10th and 11th rings. The long, light, somewhat oval mark thus formed on the 8th section, and the adjoining portions of the 7th and 9th sections, varies in colour from yellowish-grey to pale green or blue; there are also light-coloured streaks on the sides of the 3d, 10th, and 11th sections, whilst the warts of the middle row on each side are characterised by darker colouring. On the under side the caterpillars are of a dirty greenish-brown colour.

The *excretum* of the larva is shortly cylindrical, with six deep longitudinal grooves and a star-shaped cross section: in the case of the fully developed caterpillars it can attain a length of '16 inch, and a thickness of '08 to '12 inch. It is of a greenish hue when fresh, but oxidises to a yellowish colour in drying.

4. *The Pupa or Chrysalis* (see fig. 6).

This is contained in a loose web (it can hardly be called a cocoon) composed of a few threads, to which it is attached by a tuft of hook-like hairs protruding from the lower extremity. It is at first of a greenish colour, later on becoming dark-brown, and of a shiny bronzed appearance: it has small tufts of soft yellowish or reddish hair on the abdomen. The head and thorax show each a small ridge on the top, along both sides of which there are two tufts of hair of a metallic blue colour. The pupa of the male ($\frac{3}{8}$ to $\frac{1}{2}$ inch) is usually perceptibly smaller than that of the female ($\frac{1}{2}$ to 1 inch). The generation is *simple* or *annual*—that is to say, the complete cycle



Fig. 6.—Chrysalides.

from *ovum* to *ovum* lasts one year. The *ovum* stage lasts for about thirty-seven weeks, from about the end of July till the middle of April, during thirty-three weeks of which time the completely formed embryo-larva hibernates in the shell; the *larval* (or *destructive*) stage lasts for nine to ten weeks, from about the middle of April till the end of June; the *pupal* or *chrysalid* stage extends over two to three weeks, commencing about the

beginning of July; and finally the *moths or imagines* swarm for about two to three weeks towards the end of July and the beginning of August, during which time the ova of a fresh generation are deposited.

When there is a plague of spruce moths, as throughout Upper Bavaria in 1889, 1890, and 1891, ova, larvæ, pupæ, and imagines may be met with all at the same time, as was found by Nitsche¹ in the Perlacher Park near Munich in 1891.

It may be noted as of passing interest that, both in regard to the moth and the caterpillar, cases of *melanismus* are of not infrequent occurrence, to which the name *Liparis monacha* var. *eremita* has been given. That the blackness of the larvæ, however, does not at all necessarily lead to the phenomenon being continued in the imago was already known to Ratzeburg, and has recently been independently confirmed by Wachtl in Austria and Nitsche in Germany. These black spots are more frequently to be found in pine-woods² than in spruce forests, which leads Nitsche³ to believe that the variation in colour is a natural protection to make the caterpillars less conspicuous on the darker-barked stems.

LIFE-HISTORY.

As the moth swarms about the end of July and the beginning of August, it usually follows just after the pine moth (*Gastropacha pini*, L.) has completed its vital functions; but when the numbers are large the time of flight can practically extend from early in July till late in August, the male appearing first in greatest strength, and the female somewhat later; whilst towards the close of the vital period the latter are in the great majority.

During plagues of this insect the males exceed the females in number, a provision of nature to ensure due fructification of the latter, as each male can only enter once *in copula*. Huber found that in 1890, during the chief period of flight, about 70 per cent were male and 30 per cent female, which is about the same proportion as was found by Lang in 1889 in the case of the pine moth.⁴

The spruce moth is much less restful than the pine moth, as both sexes are easily disturbed and put to flight, more particularly during the warm hours of the day, although otherwise they usually remain located on the stems like small

¹ Nitsche, 'Die Nonne,' 1892, p. 13.

² Brecker in 'Zeitschrift für Forst- und Jagdwesen,' xxii., 1890, p. 590.

³ *Op. cit.*, p. 5.

⁴ *Vide* 'Forstwissenschaftliches Centralblatt,' January 1891, p. 17.

indistinct patches of lichen. They love to collect on the shady side of the stems, but prefer the edge of the forest, near roads or open spaces, to its depths: although preferring high forests with plenty of room for movement, they also swarm in thickets. As is characteristic of moths, their chief flight takes place by night, between 10 P.M. and 1 A.M., and is most active on warm nights with moonlight, when they flutter about the crowns in the enjoyment of the light. Their flight is usually against the wind, but when any bright lights are visible they love to assemble near them, and can thus, by accompanying railway trains, be carried from one locality to another, although such migrations also often take place voluntarily at night, especially during bright moonlight, towards the end of July or the beginning of August, when the insects occur in greatest numbers. Thus woods situated at considerable distance from where the moths have originally appeared are by no means safe from being visited by them, and from suffering from the devastations of the caterpillars of the succeeding generation in the following year.

The *copulation* for the most part takes place at night, and is proceeded with at once on the emancipation of the female from the pupal stage. The ova are deposited on the third day after copulation, in small thick clusters varying from 25 to 40 (up to a total of 170 per female, according to Jödan), in the fissures of the bark, under scales or lichens, in the angles of branches and twigs, or wherever there appears to be good shelter for them. By means of the long, flexile ovi-depositor, which can be curved back under the abdomen, the eggs are placed on the spots most favourable for their protection against enemies, the deposition taking place in such manner that the ova are laid under, and not merely behind, the moth; Pauly¹ states that he nowhere during the recent plague found the ova deposited on bare spots, but invariably under some sort of protecting cover. In old spruce woods ovi-deposition occurs along the whole stem, but in Scots pine forests it is mainly confined to the flaky central portion of the bole between the thickly fissured bark and the smoother rind near the crown; in younger woods it principally occurs within 4 to 5 feet above the ground. In countings that were made on eighty-nine stems in Würtemberg, 60 per cent of the ova were found above 16½ feet from the ground, and 40 per cent below that height.

The *development of the embryo* begins soon after the eggs are laid, so that within about four weeks the larva is formed, as was already noted by Jödan nearly a century ago;² but as a protection against the winter cold, it remains in the shell till

¹ Pauly, 'Die Nonne,' 1881, p. 56.

² 'Geschichte der Kleinen Fichtenraupen,' 1798, p. 11.

the advent of warm weather towards the end of the following April or beginning of May, when it effects an oval opening in the side of the egg-shell. In raw localities the time of the coming out of the larvæ may be deferred till late in May, or even till early in June in backward years. Some, exceptionally, make their appearance in autumn, invariably to die of cold (by artificial warmth they can also be tempted to come out of the shell); others come out after warm days about the middle of February, and meet with a similar fate. It has not been recorded what degree of warmth they require to entice them from the shell, but by provision of nature this seldom takes place before the trees, on which the eggs have been laid, and upon whose foliage they may be destined to feed, are putting out their flush of leaves.

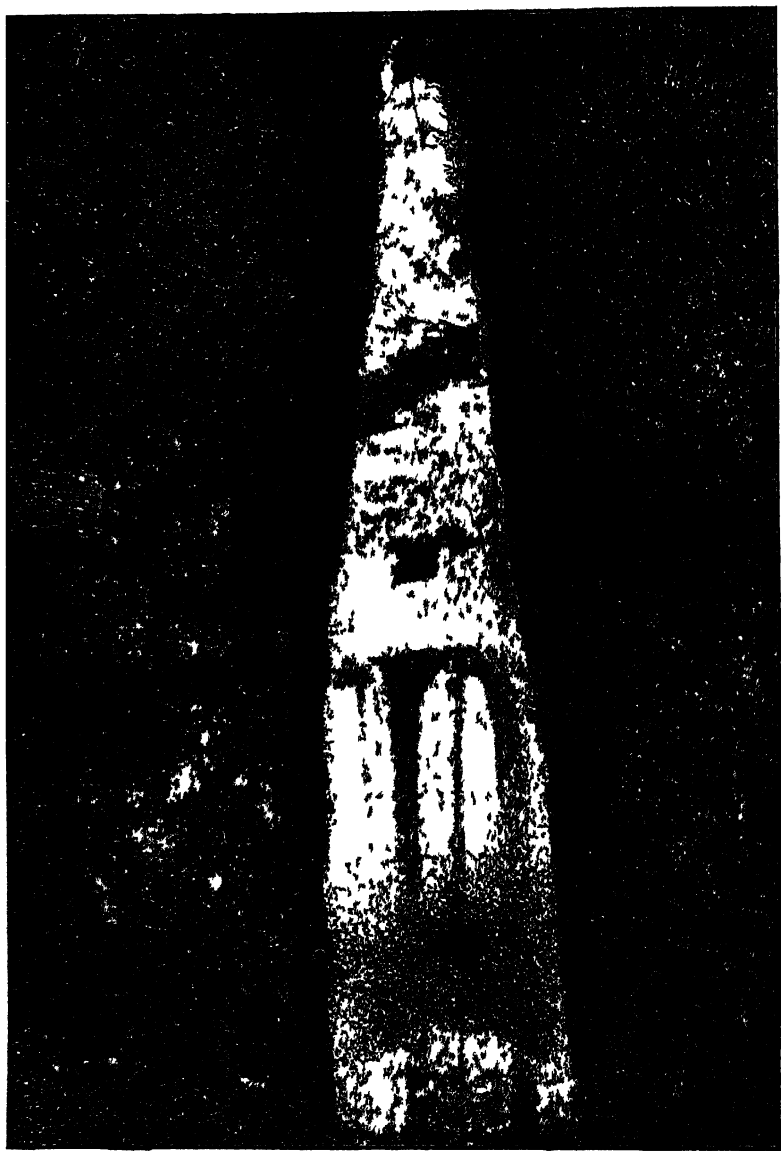
The larvæ, at first hardly longer than $\frac{1}{4}$ to $\frac{1}{3}$ of an inch, remain together in distinct clusters or schools for a few days in proximity to the broken egg-shells, which, according to Ratzeburg, seem to form their first nourishment; but in sunny weather, after four to five days, they begin their ascent towards the crown of the tree in search of food. During their upward course they spin fine webs, by which their movement is traceable. When prevented from ascending by a girdle of viscous tar, these masses of small caterpillars weave dense webs, covering the whole of the trunk below the ring, and often stretching from stem to stem like thick gauze veils, studded with thousands of young caterpillars (see Plate I.) As in the case of other caterpillars, these fine gossamer threads are spun by means of an aperture on the under lip formed by the third pair of jaws.

During this stage of development the restless activity of the young larvæ is excessive. Whenever displaced by wind or disturbed by birds, &c., they let themselves drop down by slender cobweb-like threads to lower branches, underwood, scrub, or the ground, whence they at once recommence an ascent on the nearest stems or shrubs. Young larvæ can thus easily during high winds be blown on these threads from high forests into adjoining plantations not visited by moths during the previous year.

Before each change of skin, the caterpillars again collect in clusters or schools of twenty to fifty, and in these small communities accomplish the shedding of the skin.

After the second change of skin they become too heavy to be borne by the gossamer threads, hence the power of spinning them either becomes lost, or is at any rate seldom indulged in, although their energy in movement becomes intensified rather than diminished. Heavy rain, violent winds, and hailstorms bring them down to the ground in vast numbers; but they at once recommence their journey up the nearest stems to the foliage

PLATE I



Gossamer Webs span from stem to stem by young caterpillars, when the latter are prevented from ascending owing to the trees having been ringed with patent tar.

at the top, where they swarm in enormous numbers, eagerly devouring the tender leaves, and in conifers the younger flush of needles, in preference to those of the last and previous years. When they have nearly attained their full development they acquire the habit of descending from the crowns about 4 or 5 A.M., spending the day in moss on the ground, or in fissures of the bark near the base of the stems, and ascending again about evening to feed on the foliage. Where girdles of patent tar prevent their full descent, they collect in large numbers above the rings. The natural explanation of this must be either a desire to evade the great warmth due to insolation, or an instinctive effort at escape from the Tachinæ (*Tachina monachæ* especially) and the Ichneumonidæ (*Pimpla instigator* in particular), which fly about among the crowns during the day towards the end of June, seeking the natural larval incubators for their ova.

When, as often occurs, the whole of a forest has been eaten absolutely bare, the caterpillars migrate to surrounding woods which have not been so thoroughly bereft of foliage: such wanderings usually take place sideways, or to lower-lying localities rather than towards hillsides lying higher up.

The pupal stage is often begun about the end of June, but more frequently early in July, and continues for two to three weeks on the average. Deep fissures in the bark, lichens, and tree-mosses are sought out, into which the chrysalis is fastened by means of a few scattered gossamer threads merely, and not by any regular cocoon. But failing these, the metamorphosis takes place in the tree-crowns, or on twigs of the undergrowth (*vide* fig. 5), or even on the under-surface of leaves in the case of the beech. When vast hordes of insects devastate the forests over enormous areas, the pupæ are often found in large clusters or bunches.

Feeding of caterpillars.—The caterpillars can decidedly be termed polyphagous, although not omnivorous. They seem to have an undesirable preference for spruce and pine woods, in which they primarily appear to obtain a footing before any great plague of moths occurs. From an economic point of view, they do more damage to spruce than to Scots pine. The succulent larch, silver-fir, and Weymouth pine also yield them toothsome food, but they care little for the ranker flavour of juniper and yew. Among broad-leaved deciduous trees, beech is most attacked, then hornbeam and birch. Oak cannot be said to be frequently attacked, and still less frequently maple, sycamore, elm, aspen, lime, and saugh. Alder, ash, and horse-chestnut appear not to be at all liable to danger from the caterpillars. In gardens, apple-trees are liable to attack, whilst pear-trees appear exempt. When impelled by want of food they also

attack hawthorn, hazel, and the numerous shrubs and weeds forming scrub and undergrowth under the forests, or growing in their vicinity.

The manner in which the incisions into the leaf take place are different in the various species of trees, and vary also according to the age of the caterpillar; but in general they are of such nature that, in addition to the portions of the leaves or needles actually consumed for food, large quantities of foliage are cast to the ground owing to the midrib or needle being gnawed through. This is less the case in the short spines of spruce and silver fir, and when the caterpillars are in the earlier stages of their development, as the young larvæ can only feed on the tender juicy shoots and soft spines of the spring flush when they ascend for the first time before shedding their original skin. They are unable to attack the older spines or needles until after the second change of skin, when they gnaw them right down from the tip to the base (see fig. 6). On Scots pine the older needles are gnawed through during the first weeks, but only the softer lower portions are attacked superficially, whilst the harder corners are left alone: the feeding on the young shoots does not begin on old trees till they are pretty fully developed. When, however, larvæ are blown by the wind across into young plantations, they at once attack the soft young pine shoots and foliage. Even during their later stages of development the caterpillars never eat the whole of the pine needles, as they cannot reach up to their tips, but commence gnawing at a convenient height about half-way up, the top of the needle falling to the ground, and the lower part being devoured down to the sheath.

On broad-leaved trees the characteristic manner in which the leaves are gnawed, as may be seen from such as fall to the ground, often gives evidence of this particular enemy being at work in the crowns of the trees before the fact of its presence can otherwise be discovered. The whole of the soft cellular tissue is not eaten and the skeleton merely left, as in the case of *Tortrix* larvæ, but only small oval or angular holes are gnawed here and there up till the time of the second change of skin. After that, when the caterpillars are larger, and the leaves harder and tougher, they devour the central portion of the leaves so far as they conveniently can whilst holding on by the midrib; hence only a fringe remains round the top and sides.

As in old coniferous forests most of the ova are deposited near the crown, many of the young caterpillars first attack the foliage of the lower branches before proceeding higher up, so that when the number of larvæ is not excessive, the lower branches are stripped of spines, whilst the summits of the

crowns are still green. When, like *Tortricidæ*, they let themselves down from the topmost twigs on gossamer threads, they are often caught by the lower branches, and begin feeding there if foliage is still available. In bad years, however, the whole of the crowns are gnawed from top to bottom, spruce getting totally defoliated. In pine woods the feeding also takes place from below upwards; but as the crown is much more open, the falling caterpillars are not so apt to be caught in their fall by the lower branches, hence—especially when the stems have been ringed with patent tar—the danger of total defoliation is not as great as in the case of spruce. On under-wood, or in young plantations to which the falling caterpillars may have been wafted by the wind, the feeding takes place promiscuously wherever these may happen to land.

Duration of attacks.—It has often been maintained (on Ratzeburg's authority) that when the spruce moth occurs in such numbers as to constitute a calamity, the devastations continue for three years, and then cease spontaneously; but this is only in so far correct that, usually by the third year, the balance of nature is regained through increase in the number of their natural enemies. These include birds that feed on grubs, *Tachinæ* and *Ichneumonidæ*, that increase even more rapidly than the moths, and fungoid and animalcular diseases, which break out among the caterpillars at the times of shedding the skin, and to which they are probably rendered liable by some kind of degeneration, caused through the excessive competition for food.

It remains, however, a fact, proved by experience, that after continuing for several successive years, the devastations often cease suddenly, owing principally to abnormal increase of natural parasitic enemies, which not only kill a large percentage of the caterpillars, but also of the pupæ. The caterpillars become weakened, and cluster in thousands on the topmost twigs; and when they fall to the ground they die, decompose, and poison the woodland air with their stench.

Reproductive Capacity.

In ordinary years the spruce moth is a very rare insect even in woods naturally well-suited to its mode of life, so that decades may pass without any traces of it ever being noticeable. But when once a natural increase of the species takes place, they multiply, notwithstanding their simple annual generation, with extraordinary rapidity within a few years in about eighty- to a hundred-fold geometrical progression. Should, for example, comparatively few moths be observable in any one year, the following year may bring an average of one for every stem,

which may increase to over 80 to 100 for every tree in the third year, and to over 6400 to 10,000 caterpillars per stem in the fourth spring. Preventive measures are then too late, and the calamity of enormous destruction in coniferous forests in that and the next two years can no longer be obviated: all that can be done lies in the direction of exterminating the enemy, and interfering with its free movement up and down the stems. The moths in such years are visible everywhere on the stems in hundreds as far up as the eye can reach; and if a walking-stick be thrown up into the crown to disturb them, the effect produced resembles a fall of snow in heavy flakes.

Where the damage was greatest in the Dürnbucher Forest (Lower Bavaria) in 1890, the greatest number of ova found on a totally defoliated spruce, 60 feet long by $9\frac{1}{2}$ inches mean diameter, was 10,961, and the average per stem was about 5000: large individual stems casually selected in the Ebersberger Park during the same year were found to contain 30,000, 50,000, and 90,000, with a maximum of 140,000 eggs. In the Perlacher Park in 1891, however, the *maximum* number per stem rose to the enormous figure of 200,000.¹

In all such matters prevention is of course better than cure, but, unfortunately for the practical application of this wise saw, the ova are usually so hidden away, even on stems covered with them, that they are only discernible when the upper scales of the bark have been removed. Under average circumstances, about 50 per cent of the ova are deposited more than 20 feet above the ground, but the percentage is determinable mainly by the weather; and in 1890 it was found in the Ebersberger Park near Munich that dull cloudy or rainy days led to about 75 per cent on the average being laid within 20 feet off the ground, whilst on bright sunny days, inducing the moths to fly high, it fell to about 40 per cent.

As the earlier stages of the self-assertion of the spruce moth have hitherto been always overlooked, it is not yet certain under what special circumstances the periodic increase in abnormal swarms takes place. But that there is no evidence to show, nor any good reason to believe, that it arises in woods of backward growth or of unfavourable development, was a fact already noted by Altum,² and now confirmed by the recent unfortunate experiences in the upper Bavarian forests. So much has, however, been placed beyond all question or doubt, that large pure forests are much more liable to be scourged than mixed woods, and that extensive compact woodlands are more exposed to danger than smaller blocks broken up by fields and the like.

¹ Pauly, *op. cit.*, pp. 50, 54, and 93.

² 'Zeitschrift für Forst- und Jagdwesen,' vol. ix., 1878, pp. 388, 389.

The outcome of the observations of practical sylviculturists seems to be that the increase in numbers takes place in settled colonies, but that by some natural impulse these combine in the depths of compact masses of dense forest. Here they begin their work of destruction in the following spring, gradually spreading farther and farther around, devastating the forests in an irregular centrifugal manner, due principally to the casual flight of large swarms of the restless moths during the period of ovi-deposition. No instinctive disinclination seems to exist to their covering defoliated stems also with the eggs, as the totally defoliated trees were often even more thickly covered with ova than the partially defoliated or still sound trees; hence later on, from want of food, heaps of dead and dying caterpillars lay scattered in thousands at the foot of trees which they had ascended in search of food, but found already defoliated from last year's attacks.

According to Reuss,¹ the recent appearance of the moth in enormous numbers in Upper Bavaria and Austria in 1889, 1890, and 1891 was due partly to the mild warm springs of 1883-85, which favoured the development of larvæ that would, under average circumstances, have been much reduced in number by frost and cold inclement weather, and partly to the raw wet summers which succeeded the springs in these years, and were unfavourable to the normal development of the *Ichneumonidae* and *Tachinæ*, the natural enemies of this particular insect. Pauly² also acknowledges that damp inclement weather before the first shedding of the skin probably destroys the young larvæ in great numbers, by preventing them from feeding, although it was incontestably proved in the Ebersberger Forest in 1890 that they can endure dry cold with sharp hoar-frost at night for a short time immediately after coming out of the shell without being killed.

SYLVICULTURAL IMPORTANCE.

Although the spruce moth is known locally throughout Britain as the Black Arches, it has never yet occurred in anything like such large and destructive swarms as on the Continent. The two worst attacks of the insect during the present century are those of 1853-58 in East Prussia, Lithau, and Poland (which directly occasioned attacks of *Hylesinini* in 1858 and 1859, so that the calamity was only fully ended by the beginning of 1860), and that of 1889-91 throughout southern Germany, but especially in Bavaria and western Austria. Concerning the

¹ 'Bekämpfung der Nonne,' 1892, p. 11.

² *Op. cit.*, p. 8.

former, the greatest sylvicultural insect calamity ever recorded, Willkomm gave the following details¹:—

The swarm began on 29th July 1853, and up till the 27th June 1855 over 6375 acres of coniferous forest were completely defoliated, whilst about 3250 acres more were nearly bare. The soil was covered with the larval excrement to a depth of 2 to 3½ inches, and in places even 6 inches, whilst it kept dropping down like heavy rain.

Up till 1st October 1862, over 31,363,500 cubic feet of timber had to be utilised on account of the trees having been killed—viz., 30,822,750 cubic feet—through the spruce moth, and 540,750 cubic feet through cambial-beetles (*Hylesinini*), the devastated area amounting to 21,000 acres. Throughout East Prussia the total quantity of timber that had to be felled between 1853-63, on account of these combined calamities, amounted to over 46,500,000 cubic feet, the areas affected extending over 266,942 acres. In the neighbouring Russian provinces the destruction was even greater, so that the total damage was estimated to throw about 420,000,000 cubic feet of timber upon the market, felled over an area of about 7000 geographical square miles.

During 1888, the attention of foresters was drawn to the somewhat frequent appearance of this otherwise rare moth, along with *Gastropacha pini* and *Trachea piniperda*, throughout many parts of southern Germany and western Austria; and wherever exterminative remedies were at once applied this inconsiderable production did not develop into ultimate devastation on a large scale. As the moth is in ordinary years a decided rarity, it must have been increasing during the two previous years, 1886 and 1887, quietly gathering forces for an attack in war-strength in its fourth year, 1889, when, as we have already seen, each pair may quite possibly have increased from 1 in 1886 to 80 or 100 in 1887, to 6400 to 10,000 in 1888, and 512,000 to 1,000,000 in 1889. During 1889 the attacks of the caterpillars became evident, but were confined, as also in 1890 and 1891, chiefly to the upper Bavarian plateau and western Austria, although even yet statistics are not available concerning the full extent of the timber fellings that have had to take place, and the area over which the calamity actually extended.

In Bavaria alone it was estimated that from something below 5000 acres infested in 1889, it rose to about 25,000 acres in 1890, and about 40,000 acres in 1891, for which year the actual monetary loss in the State forests alone was estimated at £40,000. The ravages were most complete in four forests, mainly covered with fine crops of spruce, three of which are royal deer-parks, and all of them within about twenty miles of Munich—viz., Perlacher Park, Forstenrieder Park, Sauerlach, and Ebersberger Park. For the sake of brevity, the ravages in the latter only will be here described; and as far as concerns the three first-named State forests, it need merely be stated

¹ Vide Hess, 'Der Forstschutz,' 1887, vol. i. pp. 354, 355.

that on 16th November 1891 an auction sale was held in Munich of the timber that had already been felled, or would have to be felled, before May 1892, in consequence of the devastation caused by this moth in 1889-91, when over 19,080,500 cubic feet of timber, mostly spruce, was disposed of for £280,577, or an average of little over 3½d. per cubic foot, as the market had to be forced locally. To simplify transport, light railways had been laid in three directions within the forests, as feeders of the trunk-lines of railway; whilst steam saw-mills were erected in numerous places in order to convert the material on the spot, and thus reduce to a minimum the outlay for transport of squares, beams, scantling, &c.

On 24th May 1892 I visited the Forstenrieder Park, and found, as later on was again to be seen in Ebersberg, a scene of desolation that can hardly be imagined without actually having once been seen: in some parts as far as the eye could reach there were only a few scattered Scots pine and beech trees left standing, where, three years previously, there were splendid forests of sixty to one hundred years of age, in which spruce was the ruling, and practically almost the only, species.

The Ebersberger Forest is a deer-park, about fifteen miles to the east of Munich, and consisted of 19,250 acres of some of the finest spruce woods in Bavaria, with only a sprinkling of Scots pine and even scantier admixture of beech. Here the presence of the spruce moth made itself noticeable in seventeen compartments during 1889, the area attacked being 1585 acres, on 750 of which the trees (almost entirely spruce) were killed outright by total defoliation. During 1890 the area infested rose to 17,500 acres, of which 5000 (including areas only slightly damaged in 1889) were totally defoliated by the caterpillars within the space of a few weeks. In 1891 the attacks spread over nearly the whole of the rest of the forests forming the park, so that the total area was more or less infested; whilst in all three years nearly 11,000 acres were totally defoliated, consisting of almost pure spruce woods of all ages, from young plantations to nearly mature crops. Besides the above, there was also serious damage done in the private and communal forests surrounding the royal park. (See Plate II.)

On 11th June 1892 I visited this forest; here also over the whole plain there was no standing timber except a few—a very, very few—Scots pine, as most of those scattered individuals of that species, which were left standing on account of their still retaining some foliage, were thrown by a violent storm during December 1891, the soil being somewhat shallow for the natural development of a deep root-system. That the attacks could primarily be in any way due to unsuitability of the soil for the spruce must be emphatically denied, as it is simply admirably

adapted to all the natural requirements of this species, being a moist sandy loam, with subsoil of gravel and rubble, whose fertility and freshness are now evidenced only by the rank soil-covering of willow-herb (*Epilobium*), deadly nightshade (*Atropa*),

PLATE II.



© Conway Gibbs 1891

View in the Ebersberger Forest in 1891, after the clearance of the spruce-trees that had been killed outright. Only a few Scots pine remained here and there, which were mostly blown down by a storm in December 1891.

groundsel and ragwort (*Senecio*), and here and there the better species of sedge (*Carex*), instead of the former luxuriant growth of spruce woods.

Immediate Consequences of the Attacks of the Caterpillars.

With their large reserves of albumen, starch, &c., and consequently stronger recuperative power, the deciduous broad-leaved trees suffer comparatively little permanent injury even from total defoliation by the caterpillars, as they can throw out their summer shoots in July after the caterpillars have entered on the pupal stage, and can begin the work of again storing up reserves of nutrient matter for the continuation of more or less normal development in the following spring. Thus the chief damage in this case amounts mainly to loss of increment; but if the attacks be continued for two or three successive years their powers of storing reserves for reproductive purposes become so weakened that they become "stag-headed," remain long sickly, or even die outright. This latter usually happens in the case of young plantations, in which the plants have not had time to thoroughly establish themselves and develop a normal root-system in their new home.

The same holds good in regard to the larch, which also usually throws out a fresh flush of leaves in summer after defoliation; but as its rough bark offers greater attraction to the moths during the period of laying their eggs, it runs much greater risk than smooth-barked trees of having a repetition of attacks during successive years.

The trees that suffer most are unquestionably the spruce, and, *longo intervallo*, Scots pine. Until after the second shedding of the skin, or about the beginning of June, the young caterpillars can only attack the tender shoots and foliage that flush in May on the spruce, but not the older leaves that have a thick tough hypoderm. In the case of the pine they can easily gnaw through the thin-skinned outer or inner surface of the older leaves, except at the hard corners. Hence in the spruce¹ the old spines can only be attacked after the caterpillars have devoured the foliage of the spring flush, and have grown in strength and gnawing power. As the pine flushes later than the spruce, the new needles are partially protected by the long dry sheaths even during June, when the feeding of the caterpillars is most destructive, so that they continue gnawing the older foliage, around which the sheaths are comparatively short; and it is only when these have been cleared away that the younger spines are attacked, and then only so far down as the sheath, so that they still have power of increasing in length later on.

In bad attacks spruce usually loses all traces of the spring

¹ Prof. R. Hartig, 'Forstlich-naturwissenschaftliche Zeitschrift,' 1892, vol. i. p. 2 *et seq.*

flush of shoots and needles by the end of May; but when the damage has been only partial, new buds can be formed even when the destruction of the older foliage is continued into July, the reproductive efforts in July varying according as the damage to the spring flush has been total or only partial. If the young shoots, before they are stripped of their foliage, have had time to harden and set new buds, these develop in July into small rosettes of leaves, seldom exceeding half an inch in length. If, however, the May shoots are early devoured, reproduction can only be carried out from the dormant buds lying at the base of each shoot under the scales of the terminal bud of last year's shoot. These dormant buds become developed, but only so imperfectly that they can afford no safe hope that the tree will remain alive and recover its normal growth; for in the vast majority of cases development only goes so far as to consume the small reserves of starchy matter present in the tree, and when these are exhausted, or nearly so, the defoliated spruce has absolutely no further reproductive power. Even when the defoliation is not complete, the recuperative vigour is decidedly weaker than in almost any other tree; in place of forming new reserves of nutrients, it lives only so long as the previous reserve capital is available, and then dies off, usually during the autumn of the same, or the spring of the following year. A partial reappearance of foliage in defoliated areas can give no reasonable hope of spruce ultimately recovering, except in the case of small seedlings up to about 2 feet in height.

During June 1892, when visiting the Ebersberger forest along with Professor Hartig of Munich University, I had opportunity of noting that even in the case of young fifteen to twenty-year-old spruce plantations, which had been in very good vigorous growth before being attacked in 1891, no fresh flush of leaves had taken place this spring unless there were at any rate *some* of last year's spines remaining undevoured; any probability of their ultimate retention of life only existed where these were at least present to some slight extent. In many cases it might be observed that in place of the needles covering the twigs of the last seven to nine years, they had been either devoured or prematurely shed, and were only to be found on the twigs of the last two years, whilst young shoots of the present year were only discoverable where at least some of last year's foliage still remained; hence the conclusion seemed obvious, that the present quantity of foliage could hardly suffice to carry out the vital functions as regards assimilation, construction of an annual ring, the formation of new buds, and the necessary reserves of starchy matter. In younger plantations the drying up of the spruce usually begins in September, but

in 80 to 100 year-old crops it usually sets in from October or November to April of the following year.

On the whole, the Scots pine suffers much less permanent damage than the spruce. But when total defoliation of Scots pine takes place, the effects are somewhat similar; the natural reproductive effort extends to the formation of rosettes of spines which consume the nutrient constructive reserves, and then death ensues. But as the reserves of starchy matter are greater in the case of the Scots pine than in spruce, and as in the spring flush the spines are to a certain extent protected during June by the long tough sheaths, and are still capable of lengthening and partially performing the work of transpiration and assimilation, it happens far more frequently than in the case of the spruce that, with assistance from the starchy reserves, vegetation can be carried on with such diminished power as at any rate to protect the trees against immediate immature death, and to allow them to recuperate and rehabilitate themselves so as, in the course of two or three years, to reattain normal development and formation of nutrient reserves for the production of seed, &c. Thus in the Ebersberger forest the only trees that were left standing over huge tracts were Scots pine, which, unfortunately, mostly became windfall during the winter of 1891-92.

Practically, therefore, both in the case of spruce and pine, the ability of the crop to remain alive depends entirely on whether a sufficiency of foliage has been left undevoured to carry on the vital functions till the reformation of a normally developed crown can take place,—and this is oftener the case with the pine than with the spruce. The experience of the last three years has also shown that many trees of the later species, though sending out a small flush of leaves in the summer after defoliation, died before the following spring, without attacks from other insects or from fungoid disease gaining a foothold, owing to their sickly condition. The reason for this fatal tendency of the attacks of the spruce moth lies in the fact that they occur just at the precise time of the year, June, when the work of assimilation is at its most important stage, and when the supplies of reserves, utilised in the formation of the dormant buds, are far sooner exhausted during the hot summer months of July and August than if they remained over, as normally, till the following spring, and then became utilised only gradually by a spring flush of foliage. Professor Hartig also found that, owing to defoliation, the sap sucked into the spruce through the root-system, not being evaporated through the foliage, remained stagnant in the stem, and became about 14° Fahr. warmer than is usual whilst in circulation in normally foliaged trees. He found that, owing to the direct insolation in totally defoliated

forests, with an atmospheric temperature of 78.8° Fahr., the temperature of the cambial layer on the sunny side had risen to 111.2° Fahr., so that between the stagnation of the sap and the abnormal warmth of the cambium, vital functions ceased, and the tree died off.

Later Consequences of the Attacks.

The stagnation of the sap, and the general sickly condition of the trees, even if they may have been only partially defoliated, make them exceedingly liable to attacks from other insects, especially the *Bostrychini* and *Hylesinini* sections of the *Scolytidæ* or bark-beetles. Thus in Ebersberg Park several thousands of partially green stems have had to be felled during May and June of the present year (1892), on account of being attacked by bark-beetles, chiefly *Hylesinus lineatus* in the case of spruce (which also suffered from *Pissodes notatus*), and of *Hylesinus piniperda* and *H. minor* in the case of Scots pine.

There has not yet been time to realise and note the full after-effects of the recent devastation in Bavaria, but the experience derived from the former far greater calamity, due to the spruce moth and consequent *Scolytidæ* in 1852-68, showed¹ that of the stems which were not totally defoliated, but had only up to one-fourth of their normal quantity of foliage, and which were allowed to stand in the hope of being able to recuperate themselves, two-fifths died within the first two years after the main attack, and the remaining three-fifths succumbed within a few years more from attacks of *Scolytidæ*, —i.e., all pines that have lost three-fourths of their foliage or more, seem marked out for premature death,—from which it seems probable that the hope of ultimately saving spruce that may have lost more than two-thirds of their foliage seems faint. But even where the proportion of foliage retained is much greater, the annual increment is reduced to a minimum for several years afterwards.

On the whole, its silvicultural importance is such that this insect must be classed as a dangerous enemy to the Scots pine, and the most dangerous of all insect enemies to pure forests of spruce, as no absolutely effective remedial measures have yet been found for the latter; and even girdling with patent tar or glue is not so successful as when undertaken in pine-forests as a remedy against the pine moth (*Gastropacha pini*). Preventive measures should be adopted at once, whenever the caterpillar or the moth is noticeable.

¹ Schultz, 'Zeitschrift für Forst- und Jagdwesen,' 1878, p. 183.

Preventive Measures.

Unquestionably one of the best measures for the prevention of attacks from this moth, as well as from other insects, lies in the formation of mixed forests, and especially the avoidance of pure forests of coniferous species. By care in tending, particularly in the conduct of thinning operations, the opportunity is given of becoming first aware of its early appearance; and the immediate adoption of preventive measures will undoubtedly often obviate great subsequent loss. Next to the formation of mixed forests and careful thinning, the best safeguard against this pest lies in the protection of its natural enemies, among which are to be numbered, of birds, the cuckoo and starling,¹ the magpie, jay, and crow at the time of feeding the young; also finches, swallows, bats, titmice, and woodpeckers in winter and spring; of insects, species of *Carabeus*, which as larvæ devour the eggs, and as full-grown beetles the caterpillars, *Ichneumonidæ* and *Tachinæ* (especially *Tachina monachæ*), which infect the caterpillars with their larvæ, and thus kill enormous numbers in warm dry summers.

Young plantations can best be protected through being isolated by a continuous row of barked poles, fastened firmly on the ground so that the caterpillars cannot crawl underneath, and smoothed and coated with a sort of patent viscous glue-like tar, to which they have a strong objection.

Exterminative Remedies.

When once they occur *en masse* no radical measures can be taken against the moths, owing not only to their restlessness during the day, but also to the fact that they cover the trees up to the top; wherever early measures, however, can be adopted, the destruction of every female means the premature cutting off of about 90 in the next and over 8000 in the succeeding year. It was hoped that by means of electric lights, arranged in the infested localities in front of exhaustors, the moths might perhaps be decimated. But though long continued, the experiments were disappointing; the moths fluttered about in dense swarms within the rays of the light, yet displayed no desire to approach close enough to be brought under the influence of the draught playing into the exhaustor.

¹ Frequently the number of starlings feeding where the swarms are thickest in the Durrnbucher Forest (Lower Bavaria) was estimated at 10,000. They fed on caterpillars, pupæ, and moths, as was afterward proved on dissection. The attraction of birds towards the infested localities was so great that the market-gardeners in the neighbourhood of Ingolstadt suffered considerably from other caterpillars, owing to starlings, titmice, finches, and the like being attracted towards the districts devastated by the spruce moth.

In Ebersberg in 1889, £24 were spent in killing moths on the 1585 acres then attacked; whilst £1500 were expended on similar works in 1890, as well as £500 for the collection and destruction of caterpillars, and a like amount for that of pupæ. The collection of chrysalides was, however, only possible to a limited extent, except in young plantations, where the tops of the plants could be reached; and the collection and destruction of eggs was also of small practical result after once the moth had appeared in large numbers (as so large a percentage of the ova are deposited over 20 feet above the ground). Enormous numbers of small larvæ were also killed whilst still collected in clusters or schools before ascending to the crowns to begin their work of destruction; but as the stems were already covered with them up to the top, this could also be of only slight practical use. When the young caterpillars spin down from the crowns of the trees to the ground they attack any young spruce foliage they find, so that if sprays and young twigs be plentifully scattered over the soil they commence devouring the foliage of these in place of at once recommencing the ascent of the stems. By collecting and burning these sprays when they are covered with caterpillars, many can undoubtedly be destroyed: although not in itself any complete remedy, this is useful in conjunction with ringing the stems with patent tar or glue.

On 24th May 1892 I had the privilege of taking part in an experiment carried out by Professor Hartig in the Forst-enrieder Park—namely, an endeavour to bring down the young caterpillars from the crowns of the trees by means of volatilising naphthalin over fires on the ground. The experiment could not be called successful; but on felling stems for inspection it was found that, although the exceptionally warm weather early in spring had brought out the larvæ, the spring shoots had not yet flushed, so that the small caterpillars above the tar girdles, unable to attack the older foliage, and weakened in addition by the cold wet weather which followed their exit from the shells, were rapidly dying off naturally through hunger.

The main remedy lies in placing around the stem (either about 15 to 18 feet above the ground, or else at breast-height) a girdle, composed of a viscous gluey or tarry substance, retaining its stickiness and odour until after the caterpillars have done feeding. The great practical utility of this method rests on the characteristic of the young caterpillars spinning themselves down to the ground on gossamer threads during the period before the second change of skin, after which their fully-developed destructive powers come into play; the re-

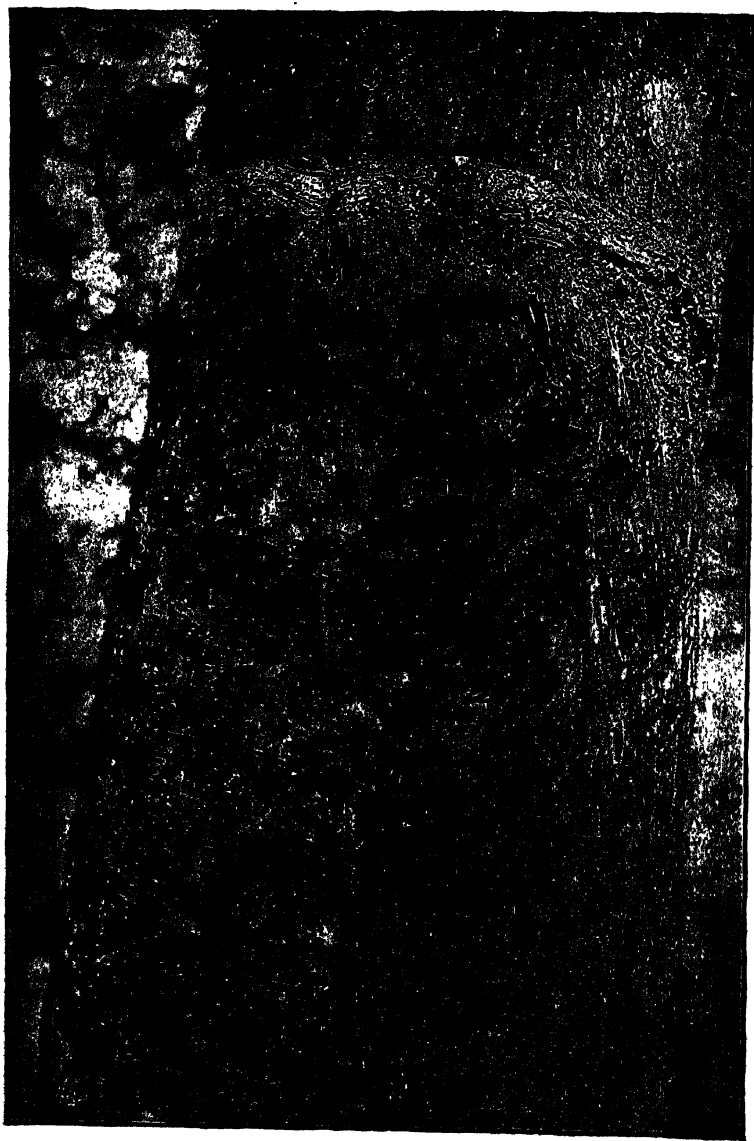
ascent of the stems being prevented by the rings of patent tar, whose odour they loathe, the caterpillars die of hunger. This method was first employed in 1889 in a small fifteen to twenty-year-old spruce plantation, which was trimmed of its lower branches and ringed with the patent tar; and as this was found to be successful, similar treatment was also accorded to other localities. In 1890 it found adoption on a much larger scale, and again more extensively in 1891; whilst in 1892 its application has been extended, throughout the whole of the tracts that have been infested, on a gigantic scale—the stem of every tree, pole, or thicket-growth of the thickness of a forefinger and upwards being ringed, whilst younger plantations have been isolated. The outlay thus incurred in 1892 in the State forests alone has amounted to £75,000 in Bavaria. As practically every caterpillar descends at least once to the ground, and as the majority reach the soil in place of being caught on lower growth, especially in old crops, the results have been that millions of caterpillars perished in 1891 and 1892 under the tar-rings, whilst those that tried to come down the stem before entering the pupal stage also found their way barred, and fell into a sickly state, besides easily falling a prey to the thousands of birds that were naturally attracted to such feeding-grounds, to parasitic insects, and to fungoid disease. (See Plates III. and IV.)

The higher up the stem the girdle is placed the more effectual it is, but also the more expensive; and in practice it cannot be put higher than 15 feet to 18 feet, somewhat thin patent tar being then used, and the ring being formed by means of a long-handled brush, fed from a reservoir above it. The extra expense of high rings is only recommendable when it is certain that a high percentage of the ova are situated on the lower portion of the stem.

Whether rings of patent tar or glue at breast-height will or will not be sufficient to save the crop, depends principally on the species of tree, for with its sparse foliage and less density of crown, Scots pine is much easier to deal with than spruce. Timely adoption of this measure can certainly minimise the evil; but when once the caterpillars swarm in enormous numbers, it can only be effective if aided by natural enemies of the insect, and by fungoid disease breaking out among the caterpillars owing to the sickly state engendered by hindrance of their usual daily progress up and down the stem towards the end of June or the beginning of July. Thousands of wooden nesting-boxes have now been hung throughout the coniferous forests in Bavaria to protect the increase of starlings.

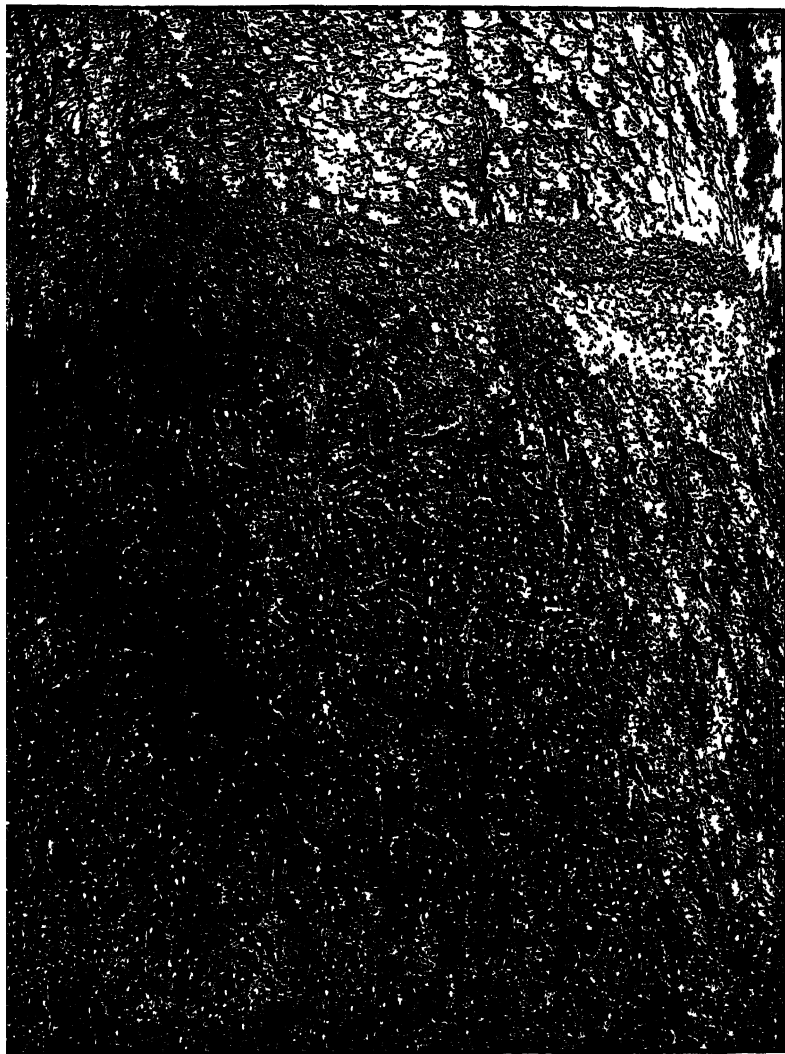
At Ebersberg (1892) the average cost of forming the rings of patent tar has amounted to about 8s. per acre; the cost of the

PLATE III.



Young caterpillars hindered by the girdle of patent tar from ascending the stem in order to commence feeding on the crown of foliage.

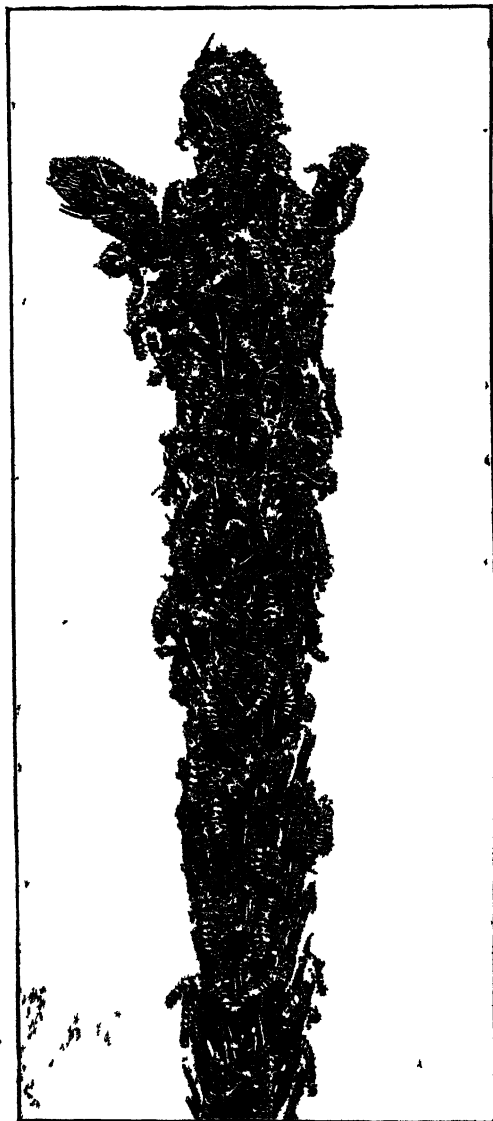
PLATE IV



Caterpillars, after having spun themselves down from the crown, are unable to reascend the stem owing to the tarry rings.

patent tar was 7s. per cwt. at the factory and 13s. in the forest ;

PLATE V.



Diseased caterpillars (1891) swarming on the top shoots of spruce-trees.

whilst the labour of ringing the stems was 7s. per cwt. About 40 lb. were used per acre on the whole average, so that the mean outlay per acre was 5s. 3d. for patent tar and 2s. 9d. for labour.

Before the operation of applying the patent tar is proceeded with, a thinning-out should take place in winter, when all suppressed stems and undergrowth should be cleared away. After that the boles must be cleaned wherever the ring is to be put, so that the semi-viscous patent tar may get a firm hold on the bark. For rough-barked trees like oak and pine, this cleaning should be about a span broad, but for smoother-barked species, like spruce, silver fir, and beech, it is sufficient merely to free the part from moss and any scaly bark attaching.

The composition of the patent tar or glue is treated as a sort of secret, but it

must be an open one, as some fifteen or sixteen firms supply it

at about the same price, 7s. to 7s. 6d. per cwt. at the factory. It consists mainly of wood-tar, resin, wood-vinegar, various oily ingredients, and probably black soap, and must possess the property of not congealing with late frosts, of remaining semi-viscous for over three months, and of not running with heat. It should float on water; if it does not, this proves that mineral ashes have been mixed with it, thereby diminishing its efficacy.

The ring should be put on thick, but need not be broad, as the caterpillars dislike either the smell or the touch of it so much as to make no attempt to cross over; hence a breadth of $\frac{1}{2}$ to 1 inch, and a thickness of $\frac{1}{6}$ to $\frac{1}{4}$ inch is amply sufficient. Owing to its semi-viscosity, the patent tar cannot be put on with brushes, but is affixed by means of special appliances; for it must bite close on to the bark, so as not to peel or flake off in places.

Apparatus of various sorts have been invented for putting it on, all of them being more or less like syringes in principle; but the simplest and best method, especially when the ring is formed at breast-height, is to apply the tar with a small narrow wooden spud about $\frac{1}{2}$ to $\frac{3}{4}$ inch broad, and to smooth it off with another slightly broader wooden instrument to the required breadth and thickness (see fig. 7). The formation of the rings must be undertaken early enough in April to be entirely completed by the time the larvæ issue from the ova.

Observations on living trees and examination of dead stems have shown that no harm is done to the trees by the rings of patent tar, and that it does not penetrate into the cambium to interfere with the normal performance of the functions of the latter, although it partially penetrates and softens the bark immediately below the ring.

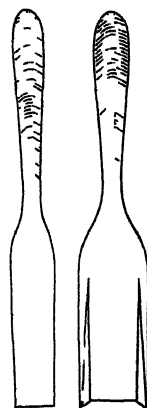


Fig. 7.—Smoothing spud-stick (about 1-6th real size).

Diseases of the Caterpillars.

Reference has been made to the fact that frequently about the third or fourth year of large swarms the caterpillars are liable to become infected with fungoid diseases, which, co-operating with the previously mentioned natural enemies among birds and parasitic insects, can of themselves ultimately bring the devastations to a close. The chief of these are the *Isaria* form of *Cordiceps militaris*, and especially *Bacterium monachæ*, which cause thousands of caterpillars to crowd in a semi-comatose condition on the topmost shoots and in the angles of

PLATE VI.



A healthy caterpillar feeding,
and a diseased one in a
comatose condition.

the twigs. (See Plates V., VI., and VII.)

With our mixed forests in Britain, and the relatively much smaller compact areas usually under timber, we enjoy comparative immunity from the calamities that arise owing to insects in the enormous, and too often pure, or nearly pure, coniferous forests in Germany. But the experience gained from Bavaria during the last four years cannot fail to teach the lesson, that whenever the spruce moth, in general a rare insect, may be noticeable in any year in the coniferous forests of the Highlands, the fiery cross should be sent out across the hills inciting all sylviculturists to wage war against a common enemy, whose devastations can spread far and wide to ruin the growth

PLATE VII



Various forms of diseases among the caterpillars.

of many years over large tracts of woodland. And it must distinctly be borne in mind that, with its migratory instincts, it is by no means confined to localities in or near where it first appears. Hence it is in the best interest of every owner of forest crops that each should give the fullest measure of assistance to the extermination of this most injurious insect as soon as any indication of abnormal increase in its numbers is observable in his neighbourhood.

GENERAL SHOW AT INVERNESS, 1892

THE Sixty-fifth Show of the Society took place at Inverness on the 26th, 27th, 28th, and 29th of July 1892. This was the eighth Show held at Inverness, the former Shows taking place in the years 1883, 1874, 1865, 1856, 1846, 1839, and 1831.

The weather was exceptionally fine throughout. The attendance of the public was unusually large for the district. The display of live stock, although somewhat short in numbers, was, as a whole, of a very high character. In the implement department there was a first-class collection of the most modern farm implements and machines.

The General Meeting of Members was held in the Pavilion in the Showyard at 12 noon on Wednesday, 27th July. Sir George Macpherson-Grant, Bart., President of the Society, occupied the chair.

ENTRIES.

The following tables show the number of entries in the different sections:—

CATTLE.

	Bulls.	Cows.	Heifers.	Oxen.	Total.
Shorthorn	27	10	27	...	64
Aberdeen-Angus	32	10	30	...	72
Galloway	2	2	6	...	10
Highland	35	14	34	...	83
Ayrshire	4	10	3	...	17
Extra . . . . .	...	1	2	6	9
	100	47	102	6	255

HORSES.

	Stallions.	Entire Colts.	Mares.	Fillies.	Geldings.	Total.
For agricultural purposes . . .	15	46	22	37	..	120
Hunters and roadsters . . .	..	..	17	...	24	41
Yearlings, the produce of the } Queen's premium stallions }	...	1	..	2	2	5
Ponies	1	...	11	4	4	20
Shetland ponies	11	...	15	1	1	28
Extra horses	2	...	.	...	2	4
	29	47	65	44	33	218

SHEEP.

	Tups.	Ewes.	Gimmers.	Lambs.	Wethers.	Total.
Blackfaced	36	6	7	4	...	53
Cheviot	38	6	7	...	...	51
Border Leicester	37	4	6	...	...	47
Shropshire	20	6	6	...	...	32
Extra sections . . . . .	...	..	...	...	15	15
Extra sheep	1	1	...	...	1	3
	132	23	26	4	16	201

SWINE.

	Boars.	Sows.	Pigs.	Total.
Large white breed . . . . .	...	...	1	1
White breed, other than large . . .	1	...	...	1
Berkshire breed	3	2	1	6
	4	2	2	8

	Entries.
POULTRY	229
DAIRY PRODUCE—	
Butter	29
IMPLEMENTS (102 stands)	1381

The following is a comparative view of the exhibition of stock, poultry, dairy produce, and implements, the premiums

offered, and the receipts (gate-money and catalogues) of each of the Shows at Inverness:—

Year.	Cattle.	Horses.	Sheep.	Swine.	Poultry.	Dairy Produce.	Implements.	Premiums.	Receipts.
1831 . . .	198	77	129	11	.	...	4	£318	£71
1839 . . .	302	93	445	43	..	...	24	744	211
1846 . . .	428	112	357	33	76	23	59	1050	254
1856 . . .	248	131	469	43	156	...	231	1000	315
1865 . . .	361	132	812	43	294	...	707	1300	920
1874 . . .	391	175	477	48	451	...	1161	2030	1120
1883 . . .	354	172	375	33	304	...	1280	1978	1295
1892 . . .	255	218	366	10	229	29	1381	2056	1749

The following remarks regarding the live stock are taken from the notes by the judges:—

CATTLE.

Shorthorns.—The class of aged bulls was a strong one. Although it did not contain any of extraordinary merit, many of the bulls were good, useful, well-fleshed animals, likely to get rent-paying stock.

In the class of two-year-old yearling bulls, the first-prize bull was an easy winner. He is rather tall and flat-sided, and perhaps not quite according to a Scotsman's idea of what a shorthorn should be, but there was not another in the class good enough to beat him.

In the yearling bull class there were some promising young bulls. The first two were very close in merit. Several of the others looked like growing into useful sires.

The class for cows was well filled. The animals were rather uneven, presenting considerable variety of type. The winner here was the most typical shorthorn in the Show, and by far the best in the class. The second winner is a neat, pretty cow; the third, a fine large-framed cow of undesirable colour. Some of the cows were very fat, uneven in flesh, and not like breeding cows.

In the class of two-year-old heifers the winner was perhaps on a small scale, but she showed all the characteristics of a high-bred shorthorn—a beautiful roan in colour, with a carcass full of the best beef where the good cuts come from, and with very little coarse offal. The second-prize heifer looks like making a nice breeding cow. She is a little bare on the loin and patchy behind. The third heifer is strong, but not fine in quality; the fourth very fat, and a little low in the back.

There was a large class of yearling heifers. The first and

second winners were two very pretty heifers, and will most likely be heard of again. Amongst the others there were several very promising young animals.

Aberdeen-Angus.—Conveniently situated as Inverness is to the "home" of the Aberdeen-Angus cattle, it was naturally to be expected that the breed would be strongly represented, and although numerically the exhibits did not exceed expectation, the general standard of merit both in the male and female classes was much above an average.

The first, second, and third prize bulls in the middle class, and the first-prize bull in the young class, were all animals of very high merit; while the first and second prize bulls in the aged class were exceptionally so. Rarely indeed do two such animals come in competition; and while the judges had no hesitation in placing them first and second, they regretted that they did not have it in their power to award the latter a premier certificate,—a position they believe he has hitherto held wherever exhibited.

In the female classes, the aged cow which was ultimately awarded the champion prize for females of the breed, and the first-prize yearling heifer, were very superior animals, and easily won their respective positions.

Galloway.—As was to be expected so far north, the display of Galloways was limited in number, but the merit of the exhibits was of a high order. There being only one class for bulls of any age, owners did not enter any young male animals, as usually they have little chance against matured beasts.

Only two bulls were forward, the one three and the other four years of age. The former was preferred for first prize, yet both animals were capital specimens of the breed, being level, massive, and possessed of genuine Galloway character.

Only a couple of cows were forward, and both were symmetrical, stylish young cows that had made great names for themselves in the south of Scotland against strong competition.

Of the two two-year-old heifers in competition, No. 142, which won first honours as a yearling at the Highland Show of 1891, was awarded the first prize. She is a beautiful specimen of the breed. No. 141 was also possessed of great merit. Yearling heifers numbered four, and were all very promising, and likely to be heard of again.

Highland.—Inverness being conveniently situated as a centre for most of the exhibitors of this shaggy and picturesque breed, the show was one of the largest and best seen at the Highland Show for many years.

The class of aged bulls was large and meritorious. The first and second prize animals were both of outstanding merit.

In the section for two-year-olds were found some excellent

specimens of the breed. The class for yearling bulls brought out a numerous entry of splendid animals, the most of those in the prize-list being of great promise.

Cows formed a very strong class. Three-year-old heifers were a very superior class, showing both style and quality, the first prize animal being awarded the cup as the champion female of the breed.

Two-year-old heifers were numerous represented, and the quality of the animals was of very high merit.

Ayrshire.—Only three bulls were shown, but they were all particularly good animals.

The first and second animals in the class for cows in milk were very good, the others in the class being only fair.

Only three cows in calf were shown, all first-class animals. Heifers of all ages made a particularly good class.

Inverness being far from their native district, the numbers were small; but for merit, there has seldom been a better display of Ayrshires at the Highland Show during the last thirty years.

Fat Cattle.—Fat cattle, although not a numerous class, were very good, especially the black Aberdeen polls. One cross ox was also a good one; he was sold at a high price.

HORSES.

Stallions and Entire Colts.—The show of agricultural horses was, without doubt, the best ever held north of the Grampians. All the classes were well filled in respect of numbers, and as a whole the quality would compare more than favourably with the average at the shows of the Society held in the south.

The class of aged stallions was led by a compact, firmly-built horse named Rosedale. This horse, in the opinion of the judges, was fully entitled to his honours, and they had little hesitation in awarding him not only first in his class, but also the championship of the Show. The second horse, named William Wood, is an old opponent of the first horse. He is quite an attractive animal, with excellent quality of bone and good feet. The third horse, Hamish McCunn, is built on a larger scale. He is a strong, big, useful animal, possibly not quite so uniform in merit as the two that preceded him. The fourth horse, Mount Royal, has a beautiful outline. The remaining prize horses in the Show of this class were useful animals.

Equally good were the horses exhibited in the class for three-year-old stallions. The first winner, Gallant Potearth, was all through the season prominent and successful in the west of Scotland. In almost every respect he is as perfect as one could wish, and the judges had no doubt therefore as to his right to

occupy the premier position. He was the premium horse for the Glasgow Agricultural Society during the season. The second horse, Royal Stuart, is an animal of great substance and weight, and has many of the points that go to make an ideal draft animal. The third horse, Royal Signet, is a good active animal, with particularly good formation behind. The fourth, Mac-cuaig, is a horse of good quality, and a good mover. The other three horses that were commended are distinctly meritorious, and worthy of all the honours they received.

The class of two-year-old colts was probably not quite so uniform in merit as the two classes that preceded it. The first-prize horse, Belvidere, was a clear winner. He is a typical Clydesdale, and should prove highly popular as a breeding animal. The second horse, Darnley Again, is a powerful, big animal of good action. The third horse, Prince Albert of Rose-haugh, was in some respects the best horse in the class. There was in him a wonderful uniformity of merit, and if many such horses continue to be bred in the north of Scotland, the districts which have hitherto enjoyed something like a monopoly in Clydesdale breeding will have to look to their laurels. The fourth horse, Choice Goods, is a well-balanced, well-coloured colt. The other three commended horses have many points of recommendation, and look like animals that will prove very useful.

The class of yearling colts was led by one of the best horses, possibly *the* best horse of his age in the season of 1892. He is named Gold Mine, and his sire was first at Stirling in 1891. The second horse, Grandeur, is also a particularly promising big animal, with plenty of size and weight. The third horse, M'Henry, is a well-balanced, useful animal, which will probably grow into a very good horse. The fourth horse, Prince of Millfield, is a big, heavy, dark-coloured colt, which has many admirers. The three commended horses were altogether worthy of the distinction which they received.

Mares and Fillies.—The class of mares with foal at foot was a very good one. Indeed the first and second were so near in merit that the judges thought it wise to get in one of their brother judges from the male ring, as it was only a matter of taste. The first mare showed most quality and the second mare most substance, both being undoubtedly very handsome mares. The third winner was a sweet mare, but visibly inferior to the other two. The other prize-winners in the class were strong useful animals.

In the class of yeld mares the first prize-winner would have been improved with a shade more of size all over, but she was so faultless, both in symmetry and action, that the judges could not get past her for the first place. The second winner was a very

substantial mare and very good quality, but she lacked the depth of body and length of pastern which characterised her more successful rival. The third winner was also a very sweet mare, full of quality and of good action. The fourth was a strong mare, but lacked the wearing characteristics of the others.

The three-year-old fillies were perhaps, as a whole, the weakest class in the Show, although, curiously enough, it contained the two best mares in the exhibition. The first and second prize-winners were both extraordinary fillies. Either of them would have graced a Highland Show, even in the south of Scotland, where all the "cracks" would be likely to meet. The judges considered that the first filly moved more perfectly, and was likely to wear better than the other, but there was very little to choose between the two. The others in this class were not very meritorious. The judges ultimately awarded the Cawdor Challenge Cup to the winner in this class.

The class of two-year-old fillies was possibly, all over, the best of the females. It furnished four excellent fillies. The first was full of quality all over, and likely to develop into a very fine aged mare. The second was also of good quality and fair size. The third was of extra size, perhaps a little overgrown. The fourth was a very nice improving animal.

In the class of yearling fillies the first winner was of good size and quality, but not so level as one could desire. The second was a little deficient in size, but full of quality, and sure to make a very good aged mare. The third and fourth were good-sized moderate fillies.

HUNTERS, ROADSTERS, AND PONIES.

Considering the distance from any sporting centre, hunters were of fair average merit. Although, as usual, some inferior animals were forward, no difficulty was experienced in finding two or three in each class of outstanding merit.

In the class for hunters foaled before 1st January 1889, a really smart four-year-old chestnut was an easy winner; well bred, of great quality, pleasant and handy to ride, with nice action, especially in his gallop, the *sine qua non* of a hunter. The second, of a different stamp, was a valuable heavy-weight hunter, riding with nice manners, giving his mount a nice feel, but lacking a little in quality. The third was a blood light-weight hunter, or lady's hack. The reserve was the only other in the class with the least pretension to the name (eventually winning the jumping contest), but his objectionable hocks and joints precluded him from getting further forward.

In the following class, three years old, there were some horses

of nice quality and action, well deserving their honours. In the next class one was forward, a blood horse of great quality, and especially worthy a prize.

Some first-class hackneys were *en evidence*, fit to win in any showyard—a beautiful four-year-old winning well in the driving class. Unfortunately the competitors forward for Mr Gilmour's prizes were very disappointing, the first and second only being worthy of mention. The premier place was taken by a well-bred mare, somewhat deficient in substance, while the second was short of quality, and more adapted to breed a harness horse than a hunter.

However, in the class for yearlings, there was provided gratifying evidence of the vast amount of good the Queen's premium stallions are doing in the extraordinary advance in quality produced by these sires, which were a meritorious lot.

The pony classes were prominent for the excellence of the exhibits throughout. In the class between 12 and 13 hands, a superb bay pony, Surprise, was of exceptional merit, both in quality and action, and withal of good bone and substance, doing great credit to her noted sire Mars. The second also was of a high order in merit; and as a whole they and the hackneys made up a capital show.

Shetland Ponies.—At Inverness the Shetland ponies were a more special feature than hitherto. A class for young stock was introduced, and the result amply justified this liberality, as there were nine, fourteen, and five entries in the stallion, mare, and young stock classes respectively; while the quality of the exhibits was greatly superior to that seen at previous Shows of the Society.

The class for stallions not exceeding 10½ hands made a very fine show of ponies, comprising several excellent specimens of the breed. The first prize fell to Laird of Noss, No. 447, a pony of extraordinary substance and great character, such as is seldom seen in a show-ring, notwithstanding the burden of twelve years he carried. The second winner was a very taking pony of good shape, fine action, and true Shetland character. The third was full of quality, with better shoulders, quarters, and hocks than are often found in this breed. He, however, lacks the bone of the ponies placed before him.

The class for mares or geldings not exceeding 10½ hands was numerically the strongest class, and included many good ponies. Some very good ones were, however, excluded from the prize-list as being less distinctively Shetland in type than necessary to qualify for honours in a special breed class, while others, from age and wear, were not seen to the same advantage as they doubtless would have shown years ago. The first and second prize mares were very good specimens of pure-bred

Shetlands. The third prize was a very sweet pony, of fine shape and action, but her colour (piebald) and blood-like appearance raised a suspicion of alien blood.

The class for ponies under three years old was the smallest in the Show. Being, however, introduced for the first time, the five entries must be regarded as a promising start. Harold, the winner of the first prize, was a very perfect pony, full of style, with beautiful action; while an excellent second was found in the two-year-old filly, No. 466.

The Champion Prize ultimately fell to Harold, whose youth and bloom barely enabled him to vanquish his sire, Laird of Noss, which has also the credit of being sire of the second-prize filly.

SHEEP.

Blackfaced.—There was a small entry of two- and three-shear tups, and the quality of the exhibits in these classes was not quite up to the standard of some former Shows. Shearlings were a much better class, the competition being very close, and all the prize tups excellent specimens of the breed. The classes for ewes and gimmers were well filled. The first-prize pens were strong and very well brought out, and the all-round quality of both classes quite up to the average standard.

Cheviot.—Cheviot sheep were a popular feature of the Show. Competition was large and keen. The aged class was headed by a four-shear sheep of a superior type. His style and gait were perfect, while he was well covered with wool of special quality—a fact in showyard Cheviots which has not had its full share of attention amongst exhibitors of late years. The second-prize sheep had great substance, but lacked the characteristic gait of the winner.

Shearlings made a capital show. When the sire lists were pitted together, it was upon very fine points that the tickets were awarded. In the ewe and gimmer classes the entries were not numerous. The prize pens showed a deal of family likeness and nice quality, but were too small.

Border Leicester.—The show of Border Leicesters was perhaps the best ever held in the Highland capital. The aged ram class—though not the strongest class in the section—was a very good one. In this class the first honours were keenly contested for by three aged rams. The first prize-winner was a well-proportioned sheep, though not so nice in his skin as could be wished, with a slight tendency to a blueness in his head. The second sheep had a very fine skin, but was weak in front. The third-prize sheep was nice and gay, but was bare on the shoulders, while his wool was not all that could be wished.

Shearling rams were by far the strongest class in the section.

The first prize-winner was a particularly good ram in all respects, and the judges had no hesitation in awarding him first in his class, and also the Tweeddale Gold Medal as the best Border Leicester ram in the Show. The second winner was an upstanding sheep, with a fine skin, but narrow in front, and not a very good turner. The other prize-winners followed very closely. In regard to the ewes there was nothing special to be mentioned.

Gimmers were a very good class. The first winners had a fine outline, with plenty of wool of good quality.

Shropshires.—Shropshires came forward in sufficient numbers to surprise the English judge, and the merits of many of the exhibits was such as to call for his highest praise.

In the aged ram class not only the winners but also the sheep that obtained honorary mention were of considerable merit. The judge had considerable difficulty in weighing their respective points to enable him to arrive at a decision.

In the shearling ram class Mr Buttar not only takes all the prizes, but also all the honorary distinctions; and it says much for the merits of the Corston flock that six such animals could have been selected therefrom. Had the Corston sheep been exhibited at the Royal English Show at Warwick, it is more than probable they would, at least, have obtained honorary distinction. The scale of the first and second prize rams gives them, in the judge's opinion, a decided advantage over that beautiful ram to which the third prize was awarded.

Mr Buttar's old ewes, to which all the prizes were again awarded, displayed very true Shropshire character; and Mr Wallace's highly commended is a useful pen of ewes. Without question the shearling ewes were *the* class of "Shrops.," and Mr Buttar cannot but feel proud of the first, second, and third prize pens he exhibited in this class, which for style, quality, and character are undeniable. The very highly commended four exhibited by the Earl of Strathmore, the highly commended by Mr Wallace, and the commended by Mr Robertson, were most creditable.

Fat Sheep.—The fat sheep were very good in every class, especially the Cheviot wethers, which have rarely been better. The three leading Cheviot pens were a rare class; crosses and blackfaced wethers were also good, but not so evenly matched, yet all showing great care in breeding and feeding, and at their ages (one-shear) great weights.

SWINE.

The pig section was very poorly represented, no animal in the whole section being worthy of special mention.

POULTRY.

In the classes of old Dorkings all the winners were really good. Cockerels and pullets were another fine lot, especially the ticketed ones. A goodly number in these classes were rather young.

Cochins and Brahmas were all less or more badly in moult; some of the best birds in Scotland were among the winners. The young ones were rather disappointing in numbers.

The Scotch Greys, both old and young, were up to the standard as regards quality.

Hamburgs were not so good as in some former years. In the Plymouth Rock classes, after the winners were picked out the remainder showed signs of the season's breeding. The winning cockerel was a perfect beauty, with the exception of his horny bill.

Minorcas were very disappointing both in number and quality. In Langshans the first birds stood clearly out from the rest. The Leghorns were rather weak in numbers, and nothing very special in merit, with the exception of the winning white cockerels, which have made such a name for themselves at the north shows.

Game fowls were small in number, but really good; Bantams were up to the mark for condition. The Duck classes were not large, and all less or more very badly in moult. Indeed, some good birds lost their chance of being in the tickets by being out of condition. Turkeys and geese were again small in numbers, but they made up for this in quality.

BUTTER.

The entries for butter competition were not numerous. It was, however, interesting, as the competition embraced makers from a wide area—the district around Inverness having only a limited production of dairy produce; while among the competitors were some from the famous butter districts around Glasgow. The butter, as a whole, was fairly good. The prize lots had all the properties of finest butter—sweet, full-flavoured, rich, and well got up. The general average, however, might be improved upon.

HIGHLAND INDUSTRIES.

The collection of exhibits of various kinds was much larger than had been received at any of the former shows. The space allotted for the goods was 20 feet by 20 feet, and it proved if

anything too small to show to advantage the numerous webs, plaids, shawls, stockings, yarn, &c.—in all, 154 entries.

The judges had a very difficult task to fulfil in awarding the prizes. They were most careful, and though it is impossible to please all exhibitors, or to persuade the defeated that they have got justice, it was universally allowed that a very difficult undertaking had been most efficiently accomplished.

There was a very marked improvement on the exhibits in general. The plaids, webs, and shawls were specially approved, and considered very fine specimens of native production. The shawls in particular were greatly admired. There is perhaps room for improvement in the stockings. Some of the patterns were not well chosen, the colours not well blended, and many of them with the overturn at the tops not reversed, so that when worn it would appear wrong-side out.

It was unfortunate that the demand for the goods at Inverness was not equal to the supply, and although a fair amount of sales were made still a large proportion was left unsold and had to be returned. Had such a fine and varied collection of Highland industries been exhibited at some of the southern shows, doubtless the trade would have been much greater.

IMPLEMENTS.

The entry of implements for Inverness Show was most satisfactory, considering the town at which the show was held; for although the metropolis of the north holds out innumerable attractions to the sportsman and the tourist, it can hardly be expected that the implement manufacturers who mean business will be at the expense and trouble of taking their exhibits so far north. Nearly all the chief implement manufacturers from England were represented at Inverness, and it is satisfactory to know that a fair amount of business was done.

There was nothing calling for particular attention amongst the exhibits except the petroleum engines, which, though not yet perfected, show every sign of becoming a very cheap and convenient motive power.

BLOCK-TEST.

Great interest was manifested in the "Block-Test," which was carried out on Tuesday, Wednesday, and Thursday. Two bullocks were killed each day. The bullocks were exhibited alive during the day, and farmers were invited to examine them and estimate their dead-weight. Prizes, consisting of a proportion of the fees paid by those handing in estimates, were awarded

to those making the best estimates. The number of estimates handed in was 133 on the first day, 113 on the second, and 133 on the third. The following are the details:—

No. of Bullock.	Fasted Live-weight in 14-lb. stones.	Dead-weight in 14-lb. stones.	Per cent of Dead to Live weight.	Highest estimated Dead-weight in 14-lb. stones.	Lowest estimated Dead-weight in 14-lb. stones.	Difference between highest and lowest estimated Dead-weight.	Money value of this Difference at 8s. 2d. per dead stone of 14 lb.
	st. lb.	st. lb.		st. lb.	st. lb.	st. lb.	£ s. d.
1	93 4	56 13	61.08	71 13	42 10	29 3 or 409	11 18 7
2	87 3	53 5	61.18	68 0	38 5	29 9 or 415	12 2 1
3	79 0	47 10	60.40	53 0	30 10	22 4 or 312	9 2 0
4	76 8½	47 10	61.32	59 0	37 7	21 7 or 301	8 15 7
5	88 6	54 3	61.31	66 3	40 0	26 3 or 367	10 14 1
6	75 0	43 11	58.39	54 8	36 0	18 8 or 260	7 11 8

Nos. 1, 2, 3, and 5 were cross-bred black polled bullocks. No. 4 was an Irish cross-bred bullock, apparently between the Ayrshire and shorthorn breeds. No. 6 was a cross-bred Canadian bullock.

The prizes for the nearest estimates of the dead-weight were won as follows:—

WINNERS.	No. of Animal.	Estimate of Dead-weight.	Actual Dead-weight.	Difference.
<i>Tuesday.</i>				
1. Jas. Howe, Castleheather, Inches, Inverness	1	54 11	56 13	2 2
2. L. Durno, Mains of Glack, Old Meldrum	2	54 5	53 5	1 0

<i>Wednesday.</i>				
1. James Henderson, Culcairn, Invergordon	3	47 8	47 10	0 2
	4	47 6	47 10	0 4
2. D. M'Raw, Moultaive, Alness	3	47 7	47 10	0 3
	4	48 7	47 10	0 11
<i>Thursday.</i>				
1. John Birnie, Balnafettack, Inverness	5	54 10	54 3	0 7
	6	44 0	43 11	0 3
2. { Peter Brown, Glenbeg, Daviot. F. D. Middleton, Rosefarm, Cromarty	5	53 6	54 3	0 11
	6	44 0	43 11	0 3
	5	54 10	54 3	0 7
	6	43 4	43 11	0 7

The Society was indebted to Messrs A. & D. Macdonald, Messrs Elliot & Co., and Messrs F. Murray & Co., for providing the bullocks employed in the test; as also to Mr John D. M'Jannet, Messrs Pooley & Son, and Messrs W. & T. Avery, who, at their own expense, supplied and fitted up the weighing-bridges used in weighing the bullocks.

PRESENTATION TO MR F. N. MENZIES.

In the Members' Pavilion on the second day of the Show, Mr F. N. Menzies was, in view of his retirement from the secretaryship of the Society at the end of the year, presented with a testimonial by exhibitors and others, chiefly those connected with the implement section of the Show. There was a large attendance of exhibitors, and the presentation was made by Mr Richard Hornsby of Grantham, who spoke in appropriate terms of Mr Menzies's long and faithful services to the Society. Mr Menzies feelingly acknowledged the honour paid to him.

The testimonial consisted of a silver salver and purse of sovereigns. The salver bore the following inscription: "This plate, along with a purse of 100 guineas, presented to F. N. Menzies, Esq., on the occasion of his retirement from the secretaryship of the Highland and Agricultural Society of Scotland, by a number of exhibitors at the Society's Annual Shows, as a tribute of their esteem, and as an acknowledgment of the courtesy always shown by him to the exhibitors.—Thursday, July 28, 1892."

THE CEREAL AND OTHER CROPS OF SCOTLAND, FOR 1892, AND METEOROLOGY OF THE YEAR, RELATIVE THERETO.

THE CROPS.

THE following comparison of the cereal and other crops of 1892 with those of the previous year, has been prepared by the Secretary of the Society from answers to queries sent to leading agriculturists in different parts of the country.

The meteorology of the year has been furnished by Dr Alexander Buchan, Secretary of the Meteorological Society of Scotland.

The queries issued by the Secretary were in the following terms :—

1. What was the quantity, per imperial acre, and quality of grain and straw, as compared with last year, of the following crops? The quantity of each crop to be stated in bushels. What quantity of seed is generally sown per acre?—(1) Wheat, (2) Barley, (3) Oats.
2. Did the harvest begin at the usual time, or did it begin before or after the usual time? and if so, how long?
3. What was the quantity, per imperial acre, and quality of the hay crop, as compared with last year, both as regards ryegrass and clover respectively? The quantity to be stated in tons and cwts.
4. Was the meadow-hay crop more or less productive than last year?
5. What was the yield of the potato crop, per imperial acre, as compared with last year? The quantity to be stated in tons and cwts. Was there any disease? and if so, to what extent, and when did it commence? Were any new varieties planted, and with what result?
6. What was the weight of the turnip crop, per imperial acre, and the quality, as compared with last year? The weight of the turnip crop to be stated in tons and cwts. How did the crop braird? Was more than one sowing required? and why?
7. Were the crops injured by insects? State the kinds of insects. Was the damage greater or less than usual?
8. Were the crops injured by weeds? State the kinds of weeds. Was the damage greater or less than usual?
9. Were the pastures during the season of average growth and quality with last year?
10. How did stock thrive on them?
11. Have cattle and sheep been free from disease?
12. What was the quality of the clip of wool, and was it over or under the average?

From the answers received, the following notes and statistics have been compiled:—

MID-LOTHIAN.—Wheat, about the same as last year in quantity; quality scarcely so good for want of sunshine; fully more straw; about 40 bushels; seed sown, 3 bushels. Barley, about the same as last year; 44 bushels; seed sown, 3 bushels. Oats, fully a better crop than last year, both in straw and grain; average, 48 bushels; seed sown, 4 bushels. Harvest began about the same time as last year, 3d September. Hay, better crop than last year; about 5 tons 15 cwt. Meadow-hay, very good crop; fine quality. Potatoes—Regents, very small crop; quite sound; 5 to 6 tons: Bruce, Main-crop, and Sutton's Abundance, about 7 tons; quite free from disease; some spoiled by frost if not lifted in time. Turnips, fully better crop than last year; yellows, 30 tons; swedes, 20 to 25 tons; only sown once; some farmers had to sow three or four times.

No injury from insects or weeds. Grass good, but too much wet weather; little feeding in it. Stock healthy, but did not fatten well. Cattle and sheep free from disease. Average clip, but lower in price.

WEST LoTHIAN.—Wheat, about the same in quantity and quality as compared with last year; from 30 to 40 bushels; seed, from $2\frac{1}{2}$ to 3 bushels. Barley, less in quantity and quality of both grain and straw as compared with last year; from 25 to 35 bushels; seed, from $2\frac{1}{2}$ to 3 bushels. Oats, better in quantity of straw—but much of it, and also grain, not so good in quality (owing to long-continued wet weather) as last year; from 28 to 38 bushels; seed, from 4 to 6 bushels. Harvest began and ended a fortnight later in the lower district, but would be fully a month later in the higher district. Hay, better in quantity, and about the same in quality as last year; $1\frac{1}{2}$ to 3 tons. Meadow-hay, good, but very little grown in the district. Potatoes, about the same in quantity and quality as compared with last year; very little disease, but a great many spoiled by frost before lifting; from 4 to 8 tons. Turnips, a very variable crop; some fields almost a failure; from 5 to 12 tons; in many cases did not braird well, and a good deal of second sowing. A good deal of turnip-fly. Crops not injured by weeds. Pastures about the same as last year. Stock did not thrive well. Cattle and sheep were free from disease. Average clip of wool.

HADDINGTONSHIRE (Upper District).—Wheat, 32 bushels; grain and straw of poor quality; 3 bushels sown. Barley, 28 to 40 bushels; quality not nearly so good as last year; grain and straw much injured by wet in harvest; seed, $3\frac{1}{2}$ bushels. Oats, 34 to 40 bushels, of good quality, but discoloured by wet in harvest; straw strong; seed, 4 bushels. Harvest began 19th September—a week later than last year; work much interrupted by wet weather, and a fall of snow in higher districts. Hay, 42 cwt.; fair quality, but injured by wet. Meadow-hay, considerably more than last year; a full crop. Potatoes, 5 to 6 tons; little or no disease; no new varieties planted. Turnips, 14 to 18 tons; the crop brairded well, and no resowing necessary. No injury by insects. No particular injury from weeds. Pastures, good growth and quality. Stock thrived very well, and were free from disease. A fair average clip.

HADDINGTONSHIRE (Lower District).—Wheat, 38 to 42 bushels; quite as much straw as last year, and both grain and straw as good quality; $3\frac{1}{2}$ bushels sown. Barley, 42 to 44 bushels; quality not quite so good as last year; more straw; $2\frac{1}{2}$ bushels sown. Oats, 44 to 48 bushels; fine quality; more straw; 4 bushels sown. Harvest began about 20th August, a day or two later than last year; showery weather for first week. Hay, 2 tons, or a little more than last year; fair mixture of ryegrass and clover; got without a shower. No meadow-hay. Potatoes, 6 to 8 tons; rather more than last year; little or no disease. The Main-crop Kidney is the best of the varieties lately brought out. Turnips, hardly such a heavy crop as last year; about 20 tons; brairded pretty well; one sowing. No injury by insects or weeds. Pastures an average, both as regards growth and quality. Stock thrived fairly well. Cattle and sheep have been free from disease. Full average clip; good quality.

BERWICKSHIRE.—Wheat, 33 bushels; quality under average; 3 bushels for seed. Barley, 39 bushels; average quality; 3 bushels for seed. Oats, 42 bushels; greatly under quality; full of unripe corn; $4\frac{1}{2}$ bushels for seed. Harvest began two weeks after the usual time. Hay, 38 cwt.; good quality. Meadow-hay, 35 cwt. Potatoes, 4 tons 5 cwt.; not much disease. Turnips, 15 tons 10 cwt.; brairded well. No injury from insects

or weeds. Pastures of average growth and quality with last year. Stock did not thrive well—too cold at night,—but were free from disease. Clip of wool, average.

ROXBURGHSHIRE.—Wheat, about 27 bushels; quality good; straw average bulk; seed, about 3 bushels. Barley, 29 bushels; dark in colour; large bulk of straw; seed, 3 bushels. Oats, 34 bushels; a good deal damaged with weather; straw above average bulk. Harvest began about a fortnight later. Hay, about an average crop; $1\frac{1}{2}$ ton; scarcely so bulky as last year. Meadow-hay, larger crop than last year. Potatoes, scarcely an average crop; about 5 tons of marketable potatoes; almost no disease. Turnips, upon good dry soil a good crop, about 20 tons; but upon wet or clay soil very small crop, in many cases not more than 8 tons; but the frost has injured them to a large extent, more especially in low-lying situations; all braided well. No injury from insects. Almost no damage by annual weeds. Pastures, fully average growth, but inferior quality. Stock did not fatten well. Cattle and sheep very healthy. Clip of wool, about an average.

SELKIRKSHIRE.—No wheat grown. Barley, 30 bushels; quality under average; seed, $3\frac{1}{2}$ bushels. Oats, 30 bushels; quantity and quality under average; indeed on the higher altitudes there will be little grain; seed, 5 bushels. Harvest began about three weeks after the usual time, and was very prolonged. Hay, not much grown; average quality; quantity more than last year; 2 tons. Meadow-hay, better than last year, but owing to the weather, part of poor quality. Potatoes, principally grown for home consumption, quite up to last year; 5 tons; partly damaged by early frost; almost no disease; usual varieties planted. Turnips, nearly up to last year, except when sown late; these are poor. Considerable damage by frost amongst the common varieties. Weight, 14 tons 10 cwt. Crop braided well; one sowing. Almost no damage by insects. No injury by weeds. Pastures, growth much greater than last year; quality average. Stock thrived well. Cattle and sheep very free from disease. Clip, average quality; quantity under average.

PERBLESSHIRE.—No wheat grown. Barley, quantity, 4 quarters—same last year; quality of grain and straw inferior to last year. Oats, quantity, $4\frac{1}{2}$ quarters; last year, 4 quarters; quality of grain and straw inferior, and not so good as last year. The commencement of harvest was three weeks later than the usual time. Hay, quantity, 2 tons 10 cwt.; last year, 2 tons; quality very good, and superior to last year. Meadow-hay, more productive. Potatoes, 5 tons this year; 7 tons last year; disease was present, but only to a trifling extent. Turnips, 24 tons this year—same last year; the crop braided well at the first sowing. No injury by insects. Weeds were not more than usually prevalent. Pastures were very luxuriant, and better than last year. Stock thrived fairly well, and were free from disease. An average clip of wool.

DUMFRIESHIRE (Upper Nithsdale).—Wheat, none grown. Barley, none grown. Oats, 30 bushels, and fair quality; straw bulky; double the quantity of previous year, and good quality, having in most cases been cut while slightly green; seed sown, 5 to 6 bushels. Harvest began later than usual, but not unduly protracted, as was the case last year. Hay, $1\frac{1}{2}$ ton—50 per cent over last year; secured in good condition; clover little seen either in the hay or aftermath; probably caused by extending use of nitrate of soda and ravages of increasingly large flocks of wood-pigeons. Meadow-hay, an average crop; about double the short crop of previous year; generally secured in July in prime condition.

Potatoes, yield about 6 tons; a smaller crop than last year, and in most fields showing a trace of disease. Turnips, 10 to 12 tons; generally about half the crop of last year; on thin dry land almost a failure; early and late sowings braired well, while fields sown about Whitsunday had often to be resown. Little damage done by insects, and no injury from weeds; the dry hot weather in July permitted of their being thoroughly dealt with. Pastures made average growth, except on hills infested with voles; but owing to great dearth of fodder in spring, cattle were turned out much too early, and prevented the grass from ever getting a proper start; the fields as a rule looked overstocked. Stock showed a want of condition, and especially was this the case with lambs. Cattle and sheep free from disease. Wool, average quality, but very short in weight.

KIRKCUDBRIGHTSHIRE.—Wheat, 31 bushels; about 2 bushels better than 1891; straw heavier; quality fair; seed, about 3 bushels. Barley, 32 bushels; about 4 bushels over 1891; straw heavier; quality fair; seed, about 4 bushels. Oats, 34 bushels; about 4 bushels over 1891; straw much heavier; quality considerably better; seed, 5 to 5½ bushels. Harvest about ten days later than usual. Hay, about 1 ton 10 cwt.; 50 per cent over last year; quality similar. Meadow-hay, about 25 per cent more. Potato crop, 5 tons 1 cwt., or about 6 cwt. under 1891; not much disease except in the early varieties; new varieties, Main-crop, good. Turnip crop, 14 tons 15 cwt.; about 2½ tons less than 1891; braird fairly good, but some resowing required, chiefly owing to condition of land and season. Little or no injury by insects. No injury by weeds. Pastures fairly abundant; quality deficient. Stock thrived moderately. Cattle and sheep free from disease. Clip of wool, not quite an average.

WIGTOWNSHIRE.—Wheat, 27 bushels; quality, 59 lb.; straw, average; seed, 3 bushels. Barley, 36 bushels; quality, 52 lb.; straw, average; seed, 4 bushels. Oats, 37 bushels; quality, 40 lb.; straw, over average; seed, 5 bushels. Harvest ten days after the usual time. Hay, 1½ ton; quality good; and both in quantity and quality rather over last year. Meadow-hay less productive, owing to cold wet season. Potatoes, somewhat less; but on account of small breadth planted, no reliable data can be given. Turnips, 10 per cent under an average crop; quality good; 16 tons; crop brairded well; very little second sowing required. No injury by insects or weeds. Pastures, over an average in both growth and quality. Stock thrived moderately. Cattle and sheep free from disease. Clip of wool, quality usual, but in quantity less.

AYRSHIRE.—Wheat, not much grown; a good bulk of straw, but the quality not good; about 30 bushels; about 3 bushels for seed. Barley, not much—in fact, just about given up; a fair average crop; seed, about 4 bushels. Oats, under an average; straw, full average, but deficient in quality; about 48 bushels; seed, 5 bushels. Harvest about ten days later. Hay, a good average crop, better than last year, only not well got; a large part of it on good well-managed land, 2 tons; and on thin cold land, 1 ton 8 cwt. Meadow-hay about an average, but very badly got. Early potatoes a good crop, and late potatoes not nearly an average, and considerably diseased; the yield of early crop, 7 tons; late crop, not more than 4 tons 10 cwt. Turnips not an average crop; too much rain in August and September; about 15 tons; brairded well, and very little resowing required. No damage by insects. A very bad year, and a good many annual weeds owing to the wet weather. A very bad grass year; a very short summer for grass; only last year was also a bad grass year. Stock thrived fairly; not an average year for milk. Cattle and sheep altogether free from disease. Clip of wool not an average.

BUTE.—No wheat of any consequence was grown. Barley, about 28 bushels; grain and straw of inferior quality, due to wet cold summer and late harvest; seed sown, 4 bushels. Oats, about 34 bushels; grain not so good, but straw more bulky than average; seed sown, 5 to 6 bushels. Commenced cutting barley on 28th August; oats about the middle of September; harvest about ten days later than usual, and very protracted owing to wet weather; not much sprouting, but grain soft and dark in colour. Hay crop under the average; about $1\frac{1}{2}$ ton; timothy, about 2 tons. Meadow-hay, little of this crop in this island. Potatoes much under average; from 4 to 5 tons; not much disease; commenced end of July; Champions, Regents, and Red Bogs form main crop; other varieties only grown to a small extent. Turnips very inferior crop, except where grown in deep good land; from 10 to 15 tons; crop braided well; a little resowing on account of bad seed being used. No injury of consequence by insects. Not much injury by weeds; owing to wet weather, turnips worse to keep clean. Pastures bare, and not equal to average. Stock thrived fairly well, but leaner in condition than usual. No disease except "braxy" amongst sheep, which was heavy on some land—almost 30 per cent. Clip of wool, fair average quality.

ARRAN.—No wheat or barley grown. Oats, about the same as last year; not an average crop these last two years. Harvest ten days later of beginning. Hay, $1\frac{1}{2}$ ton; quality good. No meadow-hay. Potatoes deficient; about 4 to 5 tons; a little disease, not much, commenced in August. Turnips, not good; from 12 to 14 tons; braided well; only one sowing; cold wet summer much against them. No insects. Weeds, a little where land was cold in bottom. Pastures, average growth; quality not so good. Stock thrived not so well. Cattle and sheep free from disease. Clip of wool rather less than average, and quality scarcely so good.

LANARKSHIRE (Upper Ward).—Wheat, none. Barley, little grown; what is, under average, both in quality and quantity. Oats, 4 bushels under last year; quality very inferior, partly through frost before ripe, and partly from the protracted and wet harvest. Harvest eighteen days after the usual time. Hay, 30 cwt., fairly well got. Meadow-hay, quality inferior to last year; quantity rather less. Potatoes, quantity one-third less than last year, and where not lifted before the frost came, one-third spoiled by frost; quantity about 5 tons average. Turnips, quantity less at least by 5 tons; braided well; no resowing. No material damage from insects. Weeds much as usual. Pastures late in coming, and season too wet. Stock thrived middling. Cattle and sheep free from disease. Clip of wool, about the same as last year.

LANARKSHIRE (Middle Ward).—Wheat, a good crop, threshing well, but much wasted by standing out during fourteen days consecutive rain; crop similar to last year; straw, 150 stones ($22\frac{1}{2}$ lb.); yield, 40 bushels; seed sown, 3 to $3\frac{1}{2}$ bushels. Barley, very little grown; yield, 40 bushels; seed sown, 4 to 5 bushels. Oats, a very good all-round crop; plenty of straw, and yielding about 40 bushels; seed sown, 4 to 5 bushels. Harvest commenced a fortnight later, but was very protracted owing to wet weather; crops on the whole partially damaged; later districts secured in better order than earlier; the worst harvest for years. Hay, very good crop; 2 tons; good quality; very good weather for making. Meadow-hay, good crop, but was again unfortunate in getting weather for making it. Potatoes, a good crop; yield, from 8 to 10 tons; Regents diseased, but mostly all dug for green sale; Bruces and Magnums principally planted; a great loss from frost before being lifted. Turnips, a short

crop, especially on stiffish soil ; brairided well, and no second sowing required ; cannot estimate yield owing to so many blanks in the district. Crops not injured to any extent by insects. Season too cold and wet for killing weeds ; green cropping land badly cleared. Pastures, good growth, but the quality not as good, owing to too much cold weather. Stock throve fair, but not as well as usual. Cattle and sheep free from disease. Clip of wool, average.

LANARKSHIRE (Lower Ward).—Wheat, about 30 bushels ; not well filled ; a great want of sunshine ; $1\frac{1}{2}$ ton straw ; about 3 bushels seed. Barley, little grown in this district. Oats, about 45 bushels ; quality very light, and not well filled. Harvest about two to three weeks later than usual. Hay, about $1\frac{3}{4}$ ton ; well got, but softer grown with the wet summer. Meadow-hay, about $2\frac{1}{2}$ tons ; timothy, heavier crop than last year. Early potatoes a very small crop—2 to 3 tons ; little or no disease ; late potatoes from 5 to 6 tons, and no disease ; Main-crop was new in this district, and did very well ; about one-third of this district was to store after the frost, and they are almost lost. No injury done by insects, only a great want of dry warm weather. No injury by weeds, only the cold wet season. Pastures better than last year. Stock throve pretty well. There has been little or no disease in this district. Almost no sheep grazed in this district.

RENFREWSHIRE (Middle Ward).—Wheat, from 36 to 40 bushels ; quality deficient ; straw, about average ; seed sown, about 4 bushels. Barley, little grown. Oats, about 42 bushels ; straw much bulkier than last season ; seed sown, about 6 bushels. Harvest about two weeks later. Quality of hay crop, fine ; about 2 to $3\frac{1}{2}$ tons. Meadow-hay less productive. Potatoes deficient, except in a few favoured districts ; crop was not only light, but also diseased ; from 4 to 5 tons. Turnip crop fair ; lighter than last season ; from 15 to 18 tons ; as a rule turnips brairided fairly well ; little resowing. Little damage done by insects. No injury by weeds. Pasture much better than last season ; deficient, however, compared with some seasons. In early part of season stock throve well, but not so well later on. Cattle and sheep free from disease. Few sheep kept in this district.

RENFREWSHIRE (Upper Ward).—Wheat, not much grown ; quality inferior, owing to want of sunshine and late harvest ; seed, 3 bushels. Barley, none grown. Oats, good crop ; from 30 to 32 bushels, but mostly wasted owing to dirty wet weather ; seed, 5 bushels. Harvest commenced about middle of September. Hay, a full average crop, and very well got ; about 40 cwt. Meadow-hay, same quantity as ryegrass, and well got, except where late in cutting ; much damaged by wet. Potatoes, a good average crop ; about 5 tons ; but where not lifted before end of October, were almost totally destroyed by frost ; some Main-crop were planted, and withstood disease better than any other sort. Turnips brairided well, and a good crop where early sown ; late sown, a very poor crop ; choked with weeds. No injury from insects. Good growth of pasture. Cattle and sheep throve well, and were free from disease. Clip of wool, about the usual.

RENFREWSHIRE (Lower Ward).—No wheat and no barley grown. Oat crop, partly in consequence of prevalence of cold east winds in May, proved deficient ; the yield varied according to locality and nature of soil, and was much about the same as last year—say, 20 to 26 bushels ; no great complaint can be made as to the quantity of straw, although it may be stated at somewhat less than in the previous crop. The harvest, which

began about the usual time, turned out to be a very protracted one, and this caused so much damage to the crop that both the grain and the straw deteriorated in value, much of both being damaged by exposure and by heating in the stack, and as a natural consequence there was a great deal of weak grain, weighing very light by the bushel. The quantity of seed sown is 4 to 5 bushels. Ryegrass hay had boisterous and wet weather to contend with for the three weeks prior to its being ready for the mower. The rainfall in May and June was 10.42 inches, whereas in 1891 it was only 4.01 inches; this excessive moisture, with stormy weather, placed the hay crop in great peril, and it was dashed about and laid so much that at one time it looked as if it must be wasted before being cut. Providence, however, is kind, and a fine spell of weather came in time; and, contrary to all expectations, the crop was secured in perhaps as fine condition and with as short a hay harvest as has been experienced for many years. The crop was more than an average in bulk; and as good prices were maintained, it has proved to be remunerative, and a help to the owners thereof in these depressed times. Meadow-hay was also excellent in quality, having been secured during the fine weather; but from the coldness of the early part of the season was scarcely up to average. The potato crop was only an average one; disease appeared about the 2d of September in the earlier kinds, but a great breadth of them was not sown in the locality, the later kinds proving to be more reliable. Compared with last year, the return would be less from 1 to 2 tons, 4 to 5 tons being the average weight of the crop. Frost with unusual severity appeared about the 25th of October, and the crop being in a great measure unsecured, damage was sustained. The early part of season for the start of green crop was unfavourable; cabbages had a very bad time of it; the weather was extremely cold, and no warmth or genial showers came to the assistance of the plants, which seemed at best rather weak, and for a time it looked as if they would be a failure. Under high cultivation and special attention no doubt some good crops were produced, otherwise they have been far below the average. Turnips suffered from cold weather, and in some cases resowing was necessary; but there were favourable chances for improvement, which took place as more genial weather set in. The quality is good, while the quantity has been deficient—13 to 16 tons being about the average weight of the crop. Wireworm and grub left their traces. Red-land oats were, as is usual in this locality, a poor crop. Pastures started earlier than in the preceding season, and were altogether better, but not up to an average; and while stock on the low lands did fairly, on the high and more exposed localities they did not do as well as could be wished. The district has been free of disease. Hill stock have done fairly well, but a more disastrous season for prices has not occurred since 1866; the over-production of sheep in a great measure accounts for this, and, with foreign importation, has upset any calculation the owners of this class of stock relied on. The clip was average. In reference to the rainfall, it varies very little from that of the previous year—1891 being 60.85 inches, and 1892 61.09 inches; and the number of dry days in 1891 being 152, and in 1892 155. How much sun beamed its rays on the dry days is not recorded, but it may be safely said that if the hours of sunshine were registered they would be very few.

ARGYLLSHIRE (District of Oban).—Wheat, none. Barley, practically none. Oats, grain better and more plentiful than last year, also better saved. Harvest was long delayed; the weather being windy, there was no growth in the stooks like last year; began to cut corn on 29th August (an average date), finished 13th October. Ryegrass-hay was of good quality, but in most cases about a quarter lighter than a good crop; clover good generally. Meadow-hay much the same as ryegrass,

both being light owing to the dry spring and summer. Potato crop was about two-thirds of last year's, which was a full crop; disease showed badly in June; tried Beauty of Bute and the Bruce—both good, not much disease in either. The turnip crop was light; in many places the yellow seed failed, and the ground had to be sown twice; in a great many cases the first sowing was a failure. Pasture was somewhat scarcer than last year. Stock did not thrive in low ground so well; but hill stock was much on a par with last year. Cattle and sheep generally free from disease. The clip was a good deal under that of 1891.

ARGYLLSHIRE (District of Lochgilphead).—Wheat, none sown. Barley, none sown. Oats, better than last year; 30 bushels; 6 bushels sown. Harvest eight days later than last year. Hay, 30 cwt.; quality good. Meadow-hay less than last year. Potatoes, yield was not so good as last year, but the quality was good; 4 tons; some disease appeared in beginning of August. Turnips, small crop; 12 tons; crop braided well. No insects. Weeds were difficult to keep under owing to the wet season. Pastures not nearly so good. Stock throve badly; not up to an average. Cattle and sheep free from disease. Clip of wool, under the average.

ARGYLLSHIRE (District of Kintyre).—No wheat grown. Barley, from 32 to 34 bushels; grain about 2 lb. per bushel lighter than last year; general weight from 50 to 53½ lb. per bushel; straw good; seed sown, about 3½ or 4 bushels. Oats, from 40 to 48 bushels on good land, and from 24 to 32 bushels on poor and high-lying land; straw very good; in the parish of Campbeltown there was a very good crop, above an average; but in Southend parish a very light poor crop, and under an average. Harvest about a fortnight later than last year. Hay, a fair crop; from 1½ to 2 tons, and on some good land 2½ tons. Meadow-hay, in general a better crop than last year. Early potatoes a very fair crop, and from 6 to 8 tons; there was some disease in the month of August; late potatoes only a very middling crop, running from 3 to 6 tons; average, about 4 tons. Turnips on good land from 18 to 20 tons; on high cold land not more than 5 tons, and on wet cold land almost a failure; braided in general very well. Less damage by insects than usual; there was a few fields in the district thinned by grub. Very few weeds on dry land, but a good many on wet cold land. Pastures not so good as last year, on account of the wet cold summer. Stock did fairly well considering the wet cold season. No disease, unless the usual "braxy" in sheep, which was less than last year. Clip of wool, about an average of the last three years.

ARGYLLSHIRE (Islands of Islay, Jura, and Colonsay).—No wheat grown. Barley, almost none grown. Oats, average quantity about 32 bushels, which is very similar to last year, but quality not quite so good; the quantity of straw this year is about one-fourth more than last; from 5 to 6 bushels sown. Harvest about ten days later than usual. Hay crop about one-third more than last year, and was secured in good order; the quantity of clover was somewhat less this year than last. Meadow-hay about one-third more than last year. Potato crop was very poor, and would not average more than 4 tons; there was not much disease, however. The turnip crop is much lighter than last year—average, barely 10 tons; in many cases the braird was very irregular, and had to be resown owing to cold and wet weather. The damage done by insects was not great. All the commoner kinds of weeds grew rapidly, and it was with difficulty the crops were kept clean. Pasture was much more abundant than last year, but quality inferior. Stock did not fatten well off grass. Cattle and sheep free from disease. Clip was about an average.

ARGYLLSHIRE (District of Inveraray).—Wheat, none sown. Barley, none. Oats, an unusually poor crop; both grain and straw less than usual; average, probably 20 to 22 bushels, and badly saved. The season was cold throughout, and we had 79.46 inches of rain during the year. Harvest about ten days later than usual, and very much later of being finished. Ryegrass and lea and meadow hay considerably less than usual; average, not much if any above 20 cwt. Meadow-hay less than last year. Potatoes less than usual; the worst crop of potatoes for many years; very difficult to estimate weight; owing to heavy rains many were late of being dug, and much damaged by frost; Champions did best. Turnips the best crop of the season; braided well, particularly those sown early; weight, from 18 to 40 cwt.; quality sound; no resowing required; those that were not sown in time could not be sown till late in the season. No injury by insects. Weeds plentiful, as is usual in wet seasons. Pastures scarcely up to last year. Stock thrived fairly well, and were quite free from disease. Clip of wool, fairly good; quality rather under usual weight.

DUMBARTONSHIRE.—Wheat, 28 to 32 bushels; 25 to 30 cwt. straw; quality inferior to 1891; soft, and in poor condition; $2\frac{1}{2}$ to 3 bushels seed sown. Barley, very little grown in this county; yield, 31 to 34 bushels; straw, 20 to 26 cwt.; about $3\frac{1}{2}$ bushels sown. Oats, 40 to 48 bushels; 25 to 30 cwt. straw; in early districts fully as good as 1891, in later districts damaged by rain in stock; 4 to 5 bushels sown. Harvest about ten days later than 1891. Hay, crop about 25 to 35 cwt.; quality good. Meadow-hay rather more productive. Potatoes not up to last year; yield 6 to 7 tons; some of early varieties dug after first week in August, about one-third diseased; later crop sound; no new varieties. Turnip crop very irregular; some places deficient, under 20 cwt.; others excellent, up to 28 cwt.; crop braided well; no second sowing. No injury by insects or weeds. Pastures about an average. Stock thrived moderately, and were free from disease. Clip of wool rather below average.

STIRLINGSHIRE (Western District).—Wheat, none sown. Barley, about 32 bushels; straw short; much the same as last year. Oats, about 33 bushels; straw short; seed, about 4 bushels. Harvest a few days later than last year. Hay rather better than last year; 30 cwt., well mixed with clover; secured in good condition. Meadow-hay an average crop, fairly well secured. Potatoes, about 6 tons; not so good quality; disease about 10 per cent. No new varieties planted that I am aware of. Turnips, a light crop; 8 tons; not good in quality; long in braiding from cold wet weather. A good many weeds amongst the turnips. Pastures rather better than last year. Cold wet weather prevented stock feeding so well as usual. Stock all pretty healthy; no contagious disease in the district. Clip of wool, much the same as last year.

STIRLINGSHIRE (Eastern District).—Wheat, 40 bushels; quality of grain not so good as last year; very bad harvest; wasted lots of grain, anything thrashed being very soft; 3 bushels sown. Barley, 30 bushels; much lighter crop than last year; dull showery harvest discoloured grain a little; $3\frac{1}{2}$ bushels sown. Oats, 32 bushels; a good crop in some districts, but some of it very much wasted; grain of very inferior colour and quality. Harvest about same time as last year, but counted late for this district. A very good hay harvest, with just a trifle too much clover; quantity, 42 cwt. Meadow-hay a very light crop, but better secured than last year. Potatoes not such a large crop as last year; from 6 to 8 tons; very little disease in late varieties, but great loss caused by the early

frosts before they were lifted. Turnips, a very much lighter crop than last; swedes, 14 tons, and yellows, 11 tons; crop did not stand well; a good deal of second sowing. No injury by insects. Mustard is the worst annual weed, which is not easily got rid of. A very cold backward grazing year, with a scarcity of grass all through. Stock did not thrive well, but were free from disease. Wool-clip not so good as last year.

FIFESHIRE (Eastern District).—Wheat, 34 bushels; straw, $1\frac{1}{2}$ ton; quality of grain deficient; straw much the same as last year; seed, 3 bushels. Barley, 32 bushels; straw, $1\frac{1}{2}$ ton; quality of grain and straw deficient; seed, 3 bushels. Oats, 38 bushels; straw, $1\frac{1}{2}$ ton; grain and straw much better than last year; seed, 4 bushels. Harvest about three weeks later than the usual time. Hay, $1\frac{1}{2}$ ton; better crop than last year; quality good. Meadow-hay, $1\frac{1}{2}$ ton; very little grown. Potatoes, 5 tons; crop less than last year; very little disease. Magnums and Bruces are chiefly grown. About one-fourth Main-crop Kidneys, which are fine quality, but small croppers. Turnips, yellow, 10 tons; swedes, 14 tons; quality good; braided well; no resowing. No injury by insects or weeds. Pastures, average growth and quality. Stock thrived fairly well, and were free from disease. Clip of wool, average.

FIFESHIRE (Middle District).—Wheat, the yield will be about 28 bushels; the quality of grain not nearly so good as last year's crop. It was put into stack in damp or raw condition, and will require the drying winds of March to put the greater part in marketable condition. The weight of straw was fully more than the crop of 1891; $1\frac{1}{2}$ ton; 3 to $3\frac{1}{2}$ bushels of seed, except in a very few cases, sown broadcast. Barley, 32 bushels, and the quality not so good as the crop preceding—comparatively few samples weighing 56 lb. per bushel. A considerable part of the crop was stacked in poor condition, and consequently there were a great number of raw and high-coloured samples exposed for sale. There was a bulky crop of straw, say 1 ton; 3 to $3\frac{1}{2}$ bushels of seed, principally broadcast. Oats a very bulky crop, but very late in ripening; indeed on high lands, and even on early farms, the later sorts of oats were cut decidedly green. They do not yield equal to the bulk—about 40 bushels. They were stacked in a raw state, and in consequence of damp mild weather many stacks were heated, and the straw very much spoilt; $1\frac{1}{2}$ ton straw; 4 to $4\frac{1}{2}$ bushels of seed. The harvest was a late one, and did not begin until about a fortnight after the usual time. It was a very protracted one, and the crop was secured, especially in late districts, in an unsatisfactory condition. There was a bulky crop of hay, and it was got in in splendid condition, green and sweet. A much heavier crop than that of the preceding year; about 2 tons. There was plenty of clover—more than in 1891. Meadow-hay, very little made in the district. Potatoes not so good as in the year preceding; about $4\frac{1}{2}$ tons. There was a severe frost in the last week of October, which damaged the outstanding crop to a very considerable extent—in many cases to the extent of a ton; very little disease; no new varieties. Turnips, the weight of this crop over the county is not equal to the crop of 1891—neither yellows nor swedes. Sowing over a second time, and in many cases a third time, was the rule and not the exception, as in average years; consequently the crop is far from uniform in weight—yellows, 12 tons; swedes, 15 tons; braird destroyed by turnip beetle or fly. On late land and on land out of condition the crops were very much injured by grub and wireworm. On earlier soils, and on land in fair condition, very little damage caused by insects. Very little injury was caused to the crops by weeds. The turnip husbandry of the district has largely diminished the seeds of weeds in the soil, and in our best soils they are almost eradicated. Pastures better; that is, pasture was more abundant,

but the quality was to my mind inferior to the pasture of 1891. The stock did not thrive so well as in 1891. Both cattle and sheep have been free from disease. There has been an isolated case of anthrax amongst cattle, but sheep have been very healthy notwithstanding the severe black frost. The quality and weight of the clip just an average one.

FIFESHIRE (Western District).—Wheat, 30 bushels; straw, $1\frac{1}{2}$ ton; bulk of straw of all cereals much as last year; grain inferior in quality and quantity, owing to sunless summer. Barley, 30 bushels; straw, $1\frac{1}{2}$ ton. Oats, 40 bushels; straw, $1\frac{1}{2}$ ton. Harvest a fortnight later. Hay, $1\frac{1}{2}$ ton; good quality. Meadow-hay, none grown. Potatoes, 4 tons; crop under average—Clark's Main-crop Kidney standing out the best. Turnips, 10 tons; a small crop, and, like cereals, affected by sunless summer. Fly on turnips was bad this year. No injury by weeds. Pastures, average. Stock thrived fairly well, but cold summer was against them. Cattle and sheep free from disease. Clip of wool, average.

PERTSHIRE (South-West District)—Wheat, a fair crop; 34 to 36 bushels; about 60 lb.; seed, 4 bushels; straw, a good average. Barley, a good crop of both grain and straw; about 35 bushels; weight, 54 to 56 lb.; seed, say $3\frac{1}{2}$ bushels. Oats, an average crop of both grain and straw; about 42 bushels; weight, 40 to 43 lb.; seed, 4 to 5 bushels. Harvest rather later than previous year, and very protracted owing to wet weather, even taking into account that farm-labourers were rather more plentiful than the season before. Ryegrass and clover-hay a full average; about 1 ton 10 cwt.; quality good. Meadow-hay, poor in quantity and quality. Potatoes, rather under average crop, but not much diseased; about 6 tons; price much the same as previous year. Turnips, much below average crop; about 12 tons; quality good enough; sown two or three times in many instances; braird destroyed by insects. Weeds troublesome, owing to the slow growth of turnips and potatoes. Pastures did fairly well, especially towards latter end of season. Stock thrived well, and were free from disease. Clip of wool, average in quantity and quality.

PERTSHIRE (District of Coupar-Angus).—Wheat, about 40 bushels; weight, 62 to 63 lb.; below average crop. Barley, average crop; 30 to 40 bushels straw; above average. Oats, fully over average; crops very varied; from 30 to 64 bushels; straw better than last year; several fields near Coupar-Angus yielded 8 quarters 43 lb. Harvest commenced 7th September, last year on 17th August. Hay, a light crop; average crop of clover. No meadow-hay. Potatoes, good average—Regents, from 6 to 9 tons; little or no disease; Fiddler's Taunt, weightier crop—from 10 to 12 tons. Turnips, one sowing generally; from 10 to 20 tons. No damage by insects. More weeds than usual—chicken-weed especially among turnips. Pastures, less than average growth. Stock thrived very middling; not so well as usual. Cattle and sheep free from disease. Clip of wool, average.

PERTSHIRE (Western District).—Wheat, none grown. Barley, none grown. Oats, not so good as last year. The harvest commenced ten days or a fortnight later. Hay crop lighter than last year. Meadow-hay light, and not very well got. The potato crop was not so good as last year, but very little disease. The turnip crop is a great deal short of last year, and in some places more than one sowing was required. Very little damage by insects; no damage by weeds. Pastures were not so good owing to the cold summer. Stock did not thrive so well. Both cattle and sheep have been free from disease. Clip of wool, quality pretty fair, but under the average.

PERTSHIRE (District of Strathearn).—Wheat, very little grown in this district; average crop, 30 to 32 bushels; 3 bushels sown. Barley, a fair crop; 40 bushels; $3\frac{1}{2}$ to 4 bushels sown; what was cut before rains a fair sample; after rains very difficult to keep, though not much spoiled. Oats, a fairly good crop; 38 bushels; fairly well filled; straw, an average crop; in certain early districts all secured in good condition, and of fine quality. Harvest about a week late of beginning, but fully a month later than usual of finishing. Hay, a good crop; got in in fairly good condition; $1\frac{1}{2}$ to 2 tons. Meadow-hay a slightly better crop than last year. The potato crop was rather under an average—6 to 7 tons; where got up early they were in good condition and very little diseased, but later varieties were very much frosted towards the end of October and November, and kept badly in pits. Turnips under an average crop; 15 to 16 tons; a good deal of second sowing was necessary in consequence of deficient braird; grub was rather destructive in some places. Insects did very little damage to crop except in a few cases of fly on turnip. There was a good deal of wild mustard in some places, which caused more damage than usual, otherwise weeds were not prevalent. Pastures were better than last year, and also of a little better feeding quality. Stock thrived fairly well, and where caked, were early ready for market. Both cattle and sheep have been free of disease. The clip of wool was an average one as regards quality and quantity.

PERTSHIRE (Highland District).—No wheat. Barley, good in straw, but grain light and inferior in quality; fairly harvested; from 32 to 35 bushels; weight, from 49 to 52 lb.; 4 bushels seed sown. Oats, good all over, but perhaps a little thin on the ground; 46 bushels; grain rather light—from 39 to 42 lb.; seed sown, about 5 bushels; harvested fairly well. Harvest about ten days later, and rather protracted, but still good in the end; plenty of wind saved the stacks. Hay an average crop; from 18 to 19 cwt.; well got in, especially in the low districts; on the high ground not quite so well. Meadow-hay, on low ground good, but on high ground very inferior—hardly worth cutting. Potatoes, a good crop; some not lifted suffered with the early frost; no disease; no new varieties; weight, about 5 tons; the frost about the middle of October was very hard on the crop all round. The turnip crop was the crop of the season; quality excellent; weight, from 18 to 20 tons; crop brairded well; no second sowing; some of the turnips were caught with the early frost before being secured. No insects. Weeds not very bad. Pastures rather below average, owing to cold spring. Cattle did not fatten very well. Cattle and sheep free from disease. Clip of wool, quality fair; average weight fair; price low.

PERTSHIRE (District of Dunkeld and Stormont).—Not much wheat sown in this district, except some spring wheat; average, 20 bushels; straw good; 3 to 4 bushels sown; quality not very good owing to wet and sunless summer; weight, about 60 lb. Barley, full crop of straw; grain not fine in quality; 50 to 54 lb.; colour dark from want of sunshine; 4 bushels sown. Oats, good crop; straw abundant; quality of grain very fair where well secured; weight, 40 to 44 lb.; yield, 40 bushels; 5 bushels sown. Harvest after usual time—very late; was not general until middle of September. Hay not good, but well secured; about 1 ton 5 cwt. No meadow-hay made in this district. Potatoes fair, but not so good as last year; considerably destroyed by frost; about 5 tons; little or no disease; Sutton's Abundant and Main-crop; Sutton's Abundant turning out well; Main-crop good quality, but not good cropper. Turnips, fair crop; weight, 16 to 20 tons; quality good; crop brairded well, but owing to wet cold weather did not grow well for some time, causing swedes to be late; some

resorted to second sowing, but they turned out a small crop. No damage by insects. Rather difficult to keep down weeds owing to wet. Pastures fair average. Stock thrived fairly well. Cattle and sheep free from disease. Clip of wool about an average.

FORFARSHIRE.—Wheat, 32 bushels from 4 bushels seed; straw not so bad quality, but grain very poor in a great many cases, and light. Barley, 44 bushels from 4 bushels sown; a good crop generally, with plenty of straw, but not so good quality as last year, and the grain not nearly so heavy or so good in quality; from 48 to 56 lb., but very little at the latter weight. Oats, yielding 60 bushels; a very good crop; above an average as regards quantity, but not quality; the straw of this crop is abundant; 4 bushels sown. Harvest after the usual time. Hay, 2 tons 5 cwt.; the clover and ryegrass being good alike. Meadow-hay, scarcely any grown in this county. Potatoes, 8 tons 10 cwt.; disease comparatively small in this district, but the severe frost in October, before the potatoes were got up, did a great deal of damage. Turnips—this crop is very deficient, and a good breadth had to be sown a second time owing to the very severe frosts so late in the spring, and a touch of the fly as well; but I think the frost did the most damage. No injury by insects, with the exception of turnips, as above stated. No injury by weeds. Pastures above an average for growth, and quality good as well. Stock thrived very well, and were free from disease. Wool an average as to clip and quality.

ABERDEENSHIRE (District of Buchan).—There is no wheat now grown in the Buchan district. The crops of barley and bere were generally good, and fully equal to last year, both as regards grain or straw; average yield about 38 bushels, and the weight from 50 to 53 lb.; this crop was secured in good order. Oats at one time looked to be the best crop for many years, but, unfortunately, owing to the severe early frosts and the continuous heavy rain during all the month of October, except the last two days, what promised to be the most bountiful harvest proved to be the most disastrous one within the memory of man: not only was the crop got secured in wretched condition, but the result of threshing-out proved that grain had suffered so much as only to weigh in many cases from 30 to 38 lb., and the quantity very deceiving; whereas in the coast-side district, where the crop was got in before the rain set in, the grain is the usual weight, and fully as much quantity. Harvest commenced generally about the 20th September, and finished about the 20th November; while some were earlier and some later. The hay crop was heavier than last year, and was secured in good order; the mixtures of ryegrass and clover were even, and the general weight about 1½ ton. Very little meadow-hay. The potato crop is good, the tubers being equal and of very fair size, with little or no disease. The turnip crop is fully an average, and would have been heavier had not the early severe frost checked the growth somewhat; some injury was done by insects, which necessitated resowing in several cases; while the braird was stiff to come away. Weeds not so numerous as last year; the weight will be, for swedes, about 25 tons, and yellows a few tons more. The pastures were never over-abundant, owing to the stock having had to be put too early on to the grass; the weather during summer was unsettled, and the grass never got ahead of the stock. The progress made by stock on the grass was not great in consequence of the somewhat ungenial season. Cattle and sheep have been free from infectious disease. The clip of wool about the average, and the prices a little less than last year.

ABERDEENSHIRE (District of Formartine).—Wheat not grown to any extent in this district. Barley and bere were generally a good crop; straw

more abundant than last year; barley harvest commenced about the middle of September; the weather was then favourable for reaping and carrying to the stackyard; this year's yield of grain would be 40 bushels, and the weight 52 to 54 lb.; 4 bushels barley and $3\frac{1}{2}$ bushels bere sown. Oats were abundant in straw, but about a third deficient in grain from last year; the frost in August and September was the cause of the deficiency of this crop; where the oats were not matured before the frosts, this crop suffered greatly, and when thrashed a very large proportion of light grain and empty hulls was the result. During the oat harvest the weather was exceedingly wet, not a whole day intervening, which caused the harvest to be protracted, lasting over ten weeks; this crop was carried to the stackyard in a very damp state, which caused much heating in the stacks; the straw was much deteriorated by the wet and long exposure of the crop in the field, and is not of the same value for feeding purposes; the average yield 28 bushels, and weight 36 to 40 lb. Harvest about a month later than last year—third week of September; the quantity sown, 5 to 6 quarters. The hay crop was secured in very good weather; the crop not so heavy as last year; deficiency about one-third both in ryegrass and clover; however, the excellent condition in which it was gathered makes up for any deficiency of last year. No meadow-hay. Potatoes a fair crop, and free from disease; owing to the frosts in August and September, which blackened the shaws, the potatoes are undersized, but good quality. The turnip crop is much better than last year, and in some districts are a very heavy crop; the average of this crop would be 18 to 35 tons; the severe bare frosts we have had lately has destroyed the yellow turnips, causing them to become a pulp. No injury by insects. The land in this district is generally kept clean, so that there is scarcely any weeds. The pastures were greatly deficient owing to the cold and wet season. The stock did not thrive well on them owing to the wet weather. Cattle and sheep have been free from disease. The clip of wool was an average.

ABERDEENSHIRE (District of Garioch).—No wheat grown. The crops of barley were generally good, but yield unsatisfactory, and 4 bushels under last year—34 bushels being a good average; but that average refers to the portion secured before the weather broke, which was not above one-third of the crop; afterwards the balance was so much destroyed that an estimate could not with any degree of certainty be hazarded. Better crops of oats before harvesting could not have been desired, and doubtless the out-turn would have been fully equal to last year had circumstances been favourable: crops which were not ripe before the severe frosts which occurred on 20th and 21st September were almost ruined, and rendered valueless; and besides the portion which was matured previous to that date, before being carried to the stackyard, both straw and grain were excessively destroyed, and rendered of little value—33 to 38 lb. being a good average weight. The harvest was commenced three weeks to a month later than usual, and was not completed in many cases before Martinmas. The quantity of hay was similar to that of last year, and well balanced as regards ryegrass and clover, but a deal of it was badly secured; the average weight would be $1\frac{1}{2}$ ton. No meadow-hay. The yield of the potato crop was above last year, yielding a weight of 6 tons, and scarcely any disease; no new varieties of any consequence were planted, but before and in course of lifting a good many suffered from frost. The turnip crop has turned out well—recent trials by Garioch Turnip-growing Association confirmed that fact; the swedish variety has not matured to the extent at one time expected, but the common sorts have met the deficiency; it is to be regretted that the very severe and bare frost about the 28th January has very much destroyed and reduced their vitality—the thermometer indicating at that date 28 to 37 degrees

of frost. No damage by insects. No injuries by weeds. Cattle were turned out early, and pasture-grass was generally deficient throughout the season ; but apart from that circumstance, the summer was very uncongential, and stock made no progress. Cattle and sheep have been generally free from disease. Clip similar to last year.

ABERDEENSHIRE (District of Strathbogie).—There is no wheat grown ; and on account of the lateness of barley its growth has been entirely given up in favour of bere, which is about ten days earlier. Gradually the area under bere has been getting into smaller compass, as the returns for a number of years have been unsatisfactory. The crop of 1892 would not give a return of $3\frac{1}{2}$ quarters, and the quality was of the most wretched description, the weight generally being about 50 lb. ; the crop having been destroyed by an early frost, the grain was of no use for malting purposes, and had to be used in the feeding of stock. Oats yielded an abundant crop of straw, and had the season been favourable they would have been one of the finest crops ever reaped in this district ; unfortunately, on the night of the 20th September, a frost of quite exceptional earliness and severity, and which registered 9 degrees, destroyed the whole of the crops in the district ; the fields were mostly quite green before the frost, and in the course of three days they became of a bluish-white colour. Oats, therefore, have given a very bad return, and yield only from $2\frac{1}{2}$ to $3\frac{1}{2}$ quarters, and weigh from 32 to 38 lb. There is really little of the latter weight, and the general average may be stated at 36 lb. In case of a failure in the crop of 1893, many farmers are purchasing seed-oats in Morayshire and in the southern counties, which were exempted from that dire calamity. The harvest was the worst and one of the longest in the experience of the present race of farmers, and was only finished about the days of the term—28th November. There was a less breadth under hay than usual, probably owing to the great scarcity and high price of grass in the early summer. Clover was generally scarce, and it was altogether a poor crop, probably not reaching on an average 150 stones of 22 lb. Owing to the abnormally cold and wet summer, potatoes generally were a poor crop, both as regards quality and quantity ; they were generally small in the run, but as a rule pretty free of disease. Turnips have grown to be a bulky crop, of good quality, and their average weight may be stated at 17 tons ; the crop braided well, but they came slowly to the hoe ; and their growth during the whole of the season was slower than usual, probably owing to the cold wet summer. Pastures were bare during the whole of the season, and grass was everywhere scarce. It was noticeable that stock did not do so well as they usually do. Sheep did not thrive well till the season was far advanced, and complaints were general that the grass was practically lost. There was no disease among either sheep or cattle. Wool was of fairly good quality, but the clip was under an average.

BANFFSHIRE (Lower District).—No wheat. Barley, good crop ; quantity, 40 bushels—some 5 bushels over last year's yield ; quality of grain good ; straw good, where early harvested ; seed generally sown, about 4 bushels. Oats, fine crop, above average ; but owing to damage by frost in September, and the unprecedentedly bad and prolonged harvest, the yield of grain will not be over 24 bushels—fully one-half of the crop being destroyed, and the quality of the straw much depreciated. Harvest about the usual time—third week of September ; barley harvest ten days earlier ; the harvest not concluded in many cases till Martinmas. Hay, about same as last year, say about $1\frac{1}{2}$ ton. Meadow-hay about same as last year. Potatoes above last year, though somewhat irregular ; yield, about 5 tons. Turnips above last year by some 6 or 7 tons ; yield, say 16 tons ; crop braided well enough, but owing to frost destroying them, some second

sowing had to be done. Not so much damage by insects as by frost. Not so much damage by weeds as previous years. Pastures of average growth and quality with last year, but neither very good. Stock thrived middling. Cattle and sheep tolerably free from disease. Clip of wool, about the same average.

BANFFSHIRE and MORAYSHIRE (Upper District).—Wheat, none grown. Barley, probable average, 21 or 22 bushels; grain in almost all cases damaged by frost in September, and rendered unmarketable for distilling purposes; the harvest was also unusually wet and protracted, and the quality of both grain and straw was thereby further deteriorated; usual quantity of seed sown, 4 bushels. Oats, in the extreme uplands cases are not infrequent where the crop has not been passed through the mill at all; in such cases the yield of grain is simply *nil*; taking this into account, 20 bushels would be about the probable average for the whole district; grain damaged by frost in the higher localities, and all over, by the excessive rains in harvest; much of the grain makes only indifferent meal, and a far larger proportion is quite unfit for seed; straw also under average quality; usual quantity sown, 5 to 7 bushels. Harvest general about 5th October—some three weeks later than an average. Hay about an average crop, perhaps slightly better than last year. No meadow-hay. Potato crop very inferior—in most cases damaged by frost in September. Turnips about an average in most cases; sowing somewhat interrupted by wet weather in May, but the braird came away with fair vigour, and little second sowing was required. No injury of consequence by insects. No particular damage by weeds. Pastures somewhat under an average, both as regards growth and quality. Stock thrived fairly, and were generally free from disease. Clip of wool decidedly under an average, both in weight and quality.

MORAYSHIRE (Lower District).—Wheat, large crop; 24 to 48 bushels; average perhaps 34; better crop than 1891 by 3 to 4 bushels; mostly stacked before the October rains, and quality good, both in grain and straw; season dull and moist, but blooming time was good; seed, 3 to 4 bushels. Barley, 24 to 48 bushels; average about 38; better crop than in 1891 by 3 to 4 bushels; quality exceedingly various—weights range from 53 to 57 lb.; about two-thirds stacked before the October rains; quality of this portion fairly good, some of it very good; remaining third much spoiled by sprouting and darkening of colour in stook, and by being stacked in bad condition; seed, 2½ to 4 bushels. Oats, big fine crop; comparatively wet year—favourable for oats; yield would average perhaps 42 bushels; quality excellent; weight, 42 to 45 lb.; mostly stacked before October rains; portion out during October a good deal spoiled, but not so much as barley; seed, 3½ to 4 bushels. Harvest general by 1st September, fully as early as in 1891; September good harvest weather on the whole, though occasionally rough and showery; some finished harvest before September ended—and lucky men they were; others had some out when October rains came on; a few had nearly their whole crop out; October stopped harvest operations altogether till near the end of it; harvest not finished till a week or more into November; long and expensive harvest. Hay crop small; not over 1½ ton; less by half a ton than the crop of 1891, but making better done, though weather was far from dry and steady. Meadow-hay, none in district. Potatoes much better crop than in 1891; in many cases yield would be double; it would vary from 4 to 9 tons; average perhaps 6 tons; no disease to speak of; lifting late and difficult, owing to lateness of harvest and wet season; variety for wholesale marketing chiefly Magnum Bonums; Red-cups much in favour for table use; no new varieties. Turnips much better crop generally than in 1891, when

on damp land turnips were almost a complete failure; average would be over 20 tons; brairding was very satisfactory, soil being damp, and not too much so; very little resowing. No injury by insects. Weeds were very difficult to kill in consequence of the weather being often wet, but not quite so difficult or impossible as in 1891; damage from weeds less than in 1891. Pastures better than in 1891. Stock thrived well, and were free from disease. Clip of wool, about same.

NAIRN-SHIRE.—Wheat, none. Barley, 32 bushels; quality, part good and part darkened by rain; straw, good quality; 4 bushels. Oats, 40 bushels; quality fairly good, but darker than last year; straw more in bulk, quality not so good; 4 bushels. Harvest three weeks after usual time. Hay, quantity and quality about equal to last year. Meadow-hay, none. Potatoes, yield equal to last year; no disease. Turnips, about 15 tons; a good deal spoiled by finger-and-toe and frost; braided well. No damage by insects or weeds. Pastures of average growth and quality with last year. Stock thrived on them not quite so well, being wet season. Cattle and sheep were free from disease.

INVERNESS-SHIRE (District of Inverness).—Breadth of wheat very limited, and quality inferior; quantity sown, from 3 to 4 bushels; yield, about 30 bushels. The yield of barley was fair as regards quantity, but the quality was, with few exceptions, disappointing, in consequence of the unusually moist and sunless season; average quantity of seed sown, 4 bushels; returns about 40 bushels on best soils, and 30 on poorer soils; the harvest was the most tedious on record. The oat crop was a magnificent one when growing, and when ready for reaping it promised well, but the unfortunate harvest operations told considerably against its value to the farmer—still, it was the best crop in the north; average quantity sown, from 4 to 5 bushels; returns from 30 to 48 bushels. The harvest was unusually late, and was the most protracted experienced for a considerable period; one of the finest crops of the century was much damaged in the late districts, and although no second growth occurred, the crops were discoloured and otherwise damaged. Hay, quantity, from 1 to 2½ tons, according to quality and condition of soil; no damaged hay in this district; quality superior to 1891 crop. No meadow-hay in district embraced. Potatoes, yield about an average as to quantity; quality fair, but inferior to some years; there was no disease; the new varieties planted were Bruce and Main-crop, and gave good results. The turnip crop was not equal to crop 1891; there were, however, some good fields on well-farmed lands; yield from 20 to 30 tons; there was very little second sowing. Owing to a night's frost and sunshine following, some of the turnip braird suffered, but the damage was inconsiderable. Owing to the wet season turnips were difficult to keep clean on account of the growth of ordinary weeds. Pastures, fair average growth, but they were not nutritious, owing to a superabundance of wet. Stock thrived middling. Cattle and sheep free from disease. Clip of wool about an average.

INVERNESS-SHIRE (District of Beaulieu).—Wheat, scarcely any grown in the district, but what there was would be much about the same as last crop, say about 26 bushels, of fair quality. Barley, a very heavy crop, grown more bulky than last year, but greatly damaged in harvest by wet; seed used, about 4 bushels. Oats, large crop of straw and grain grown, but so much damaged in harvest that both are now of little value; seed used, about 6 bushels. Harvest fully three weeks later than usual. Hay, about 1½ ton, of excellent quality, and well harvested; nearly one-third heavier than last year. Meadow-hay, none in this district. Potatoes—the yield would be much the same as last year, 3½ to 4 tons, of very

fine quality; scarcely any disease. Turnips—the weight would be under last year by 2 tons; finger-and-toe in many places bad; crop braided well, and came to the hoe early, but finger-and-toe began soon after, and hindered growth very much. No insects; but the crops were destroyed to a most unusual extent by wild pigeons and pheasants—the greatest turnip scourge we have had for years. No damage by weeds. Pastures fully average growth, but owing to the wet season and want of sunshine, rather under the quality of last year. Stock thrive not so well as the former season; the weather being cold and wet, the stock had seldom a dry bed. Cattle and sheep quite free from disease. Clip of wool, fully an average.

INVERNESS-SHIRE (Skye).—Wheat, none grown. Barley, none grown. Oats, quite an average crop—30 to 32 bushels; 6 bushels generally sown. Harvest about two weeks later than usual; corn crops were again damaged by wet weather. Hay, a light crop of both; secured in good condition. Meadow-hay, about the same as last year. Potatoes—this crop varied much; on some farms quite a failure, on others a fair crop; taking the average, a very poor crop; disease appeared in August. Turnips, a good sound crop, which have kept well; the crop did well all the season; only one sowing required. No damage by insects or weeds. Pastures of average growth and quality with last year. Stock thrive very well considering the reduced condition into which a severe winter and spring had brought them. Cattle and sheep free from disease. A light clip, of good quality.

INVERNESS-SHIRE (Lochaber).—Wheat not grown in Lochaber district. Barley, very little grown. Oats, 32 bushels; rather more straw than previous year, but quality bad owing to excessive rains at harvest time; seeding, 6 bushels. The harvest was a fortnight later than usual. Hay, 1 ton 6 cwt.; ryegrass, light; clover, very good. Meadow-hay less productive, owing to persistent wet. Potatoes, 5 tons; very little disease, but a good deal of damage done by frost; no new variety planted. Turnips, 10 tons; quality bad; crop braided well; no second sowing required. Turnip crop injured to a great extent by finger-and-toe disease. Oats injured by "yarr," and turnips by chickweed to a greater extent than usual. Pastures were not of average growth or quality. Stock did not thrive so well as usual. Cattle and sheep have been free from disease. Clip of wool, average.

ROSS-SHIRE (Western District).—Wheat, none sown. Barley, little or none sown. Oats, 6 bushels generally sown; quality of grain and straw much as last year; quantity about 2½ quarters. Harvest about three weeks later than last year. Hay, quantity 1 ton; quality fair. Meadow-hay less productive. Potatoes, yield fully a third less than last year; quantity, about 5 tons; little or no disease; no new varieties planted. Turnips, 10 tons; quality fair; braided well; only one sowing required. No injury by insects or weeds. Pastures much the same as last year. Stock thrive well, and were free from disease. Clip of wool, quality good; fully an average.

ROSS-SHIRE (Districts of Dingwall and Munlochy).—Wheat, quantity less, say 32 bushels; quality below average; breadth sown was less; seed, 3 to 4 bushels; straw average in quantity, below in quality. Barley, quantity average, say 38 to 40 bushels; quality much below average; same applies to straw, crop being much laid, and suffered in the stock. Oats, quantity over average, say 32 bushels; quality also worse; quantity of straw over average; quality much deteriorated by rains while in stock,

and much was harvested in poor condition; later holdings suffered from frost on 21st, 22d, and 23d September. Harvest began about 3d September, some eighteen days later than average; was very protracted owing to wet weather. Hay was about an average, and in general well got; clovers fairly plentiful; weight, say $1\frac{1}{2}$ ton. Meadow-hay, none. The potato crop was early injured by frost; quantity and quality were below average; crop, about 5 tons; almost no disease. Turnip crop again below average weight, say 14 tons; crop braided very slowly, owing to cold weather and land too wet; no resowing required. No injury by insects or weeds. Pastures never grew freely owing to cold and wet; growth fully 25 per cent below average. Stock did not thrive well, but were free from disease. Clip of wool, about average.

ROSS-SHIRE (Tain, Cromarty, and Invergordon).—Wheat, 34 bushels—considerably below average; $3\frac{1}{2}$ to 4 bushels seed; quality not so good. Barley, 42 to 44 bushels; quality below average; seed, 3 to $3\frac{1}{2}$ bushels. Oats, 44 bushels; quantity of straw above average; quality of grain and straw below average; seed, 4 bushels. Harvest ten days later than average; first half of harvest good, latter half wet. Hay, barely an average; quality good; weight, $1\frac{1}{2}$ to $1\frac{1}{2}$ ton. No meadow-hay grown. Potatoes not so heavy; $5\frac{1}{2}$ to 6 tons; next to no disease; growth checked with frost in July. Turnips not so good; quality inferior; swedes, 20 to 22 tons; yellows, 18 to 20 tons; were not affected with finger-and-toe, which was very general; braided slowly; some resowing owing to cold weather. No injury by insects. Not an average; damaged by weeds. Pastures 25 per cent under average growth and quality owing to wet cold weather. Stock did not thrive well owing to cold. Cattle and sheep quite free from disease. Clip of wool, average.

SUTHERLANDSHIRE.—Wheat, none grown. Barley, 32 to 36 bushels; quality and weight inferior; 2 to 3 lb. per bushel lighter; seed, 4 to 5 bushels. Oats, crop very variable; on dry land very fair, but on others poor, with less bulk of straw and grain; 3 to 4 lb. per bushel lighter; average, 32 bushels; seed, 5 to 7 bushels. Harvest two to four weeks later, according to locality; one of the worst harvests on record, and crops much damaged by wet. Hay about the same as last year—1 to $1\frac{1}{2}$ ton; well got. Meadow-hay, little grown. Potatoes, 4 to 5 tons; quite up to last year; no disease. Turnip crop very variable; best from 12 to 18 tons; quantity and quality better than last year; crop braided well; little or no second sowing. Little damage by insects this year. Weeds plentiful, but not more than usual. Abundance of grass, but quality inferior owing to heavy rainfall. Stock, former part of season did well, but latter part too wet, and cattle did not thrive. Clip of wool, below average.

CAITHNESS-SHIRE.—Not a wheat-producing district. Barley, none grown. Bere, quantity of grain and straw much the same as last year; grain, about 20 bushels; quantity of seed sown, 4 bushels. Oats, quantity of grain and straw a little more than last year; quantity of seed sown, 6 bushels. Harvest began after the usual time. Quantity of hay crop much the same as last year; quality better. Meadow-hay more productive than last year. Potatoes, better than last year; quantity, 8 tons; no disease; same variety (Champion). Turnips, about 12 tons (yellows); braided very well; one sowing. Not aware of any injury caused to crops by insects in this locality. Nothing to complain of in regard to weeds. Pastures last year were very bad, and this year also; causes, cold and soaking rain. Considering the shortness of grass, stock thrived fairly; cattle in rather better condition than last year. Cattle free from disease; a large loss of sheep in some places from liver-fluke. Clip of wool, average.

ORKNEY.—There is no wheat grown. Bere was a fair crop, yielding about 32 bushels, and weighing 46 lb. ; the usual seed is $3\frac{1}{2}$ to $4\frac{1}{2}$ bushels. Oats, straw is below the average bulk, but there is more grain this year than last—the yield being about 28 bushels, and the weight about 36 lb. ; a storm, accompanied with a deluge of rain, on 3d June checked the growth and did much damage to the braird, which up to that time looked very well ; the cold wet autumn prevented the grain from ripening, and although harvest did not commence until the first week of October, being about three weeks later than usual, a large proportion of the crop had to be cut with a green shade ; the usual seed is 4 to 6 bushels. Owing to a short crop of turnips last year, the cattle had to be put out early to grass, and most of the new grass had to be pastured ; there was consequently little hay made, and the yield was also deficient, being about 20 cwt. There is only some coarse meadow-hay, grown on wet meadows. Potatoes are a good crop, yielding about 6 tons, which is a great improvement on the miserable diseased crop of last year. Turnips vary considerably in different districts, but are a fair crop, considerably better than last year—the yield being about 10 tons ; this is a fair crop, considering that the greater part of it had to be sown so late as the latter half of June, on account of the very wet weather during the latter half of May and first few days of June. There was not much damage done to the crops by either insects or weeds. Pastures were rather bare all season, consequently stock did not thrive extra well. There was a good deal of disease and death among cattle and sheep in the spring, owing principally to the short winter keep, bare pastures, and cold changeable weather ; horses also suffered from influenza and strangles ; since then, however, stock have been fairly healthy. Clip of wool, about the average.

SHETLAND (District of Lerwick).—Wheat, none. Barley, grain very inferior in quantity and quality ; straw a good crop, larger in quantity and superior in quality. Oats, grain light and less in quantity ; straw more in quantity, and of good quality. Harvest about three weeks after the usual time. Hay—yield below last year ; ryegrass fair, but clover very inferior ; quality inferior, owing to the wet weather after it was cut. Meadow-hay, a fair average crop ; about equal to last year. Potatoes—there is a better yield than last year, but the quality is hardly so good ; no disease. The turnip crop is slightly heavier than last year, and the quality superior ; the crop braided well ; only one sowing. No injury by insects. In some places there was more than the usual quantity of wild mustard among the corn owing to the wet season ; but this was not general. Pastures about a fair average—equal to last year. Stock did not thrive as well as usual ; the season was wet and cold, and grazing stock did not feed kindly. No disease. Clip of wool—the quality is good, but the weight of the clip is slightly under the average.

THE METEOROLOGY OF 1892.

The following table gives a comparison of the winds and sunshine of 1892 with the averages of previous years:—

TABLE SHOWING FOR WIND DIRECTION AND FORCE, AND FOR SUNSHINE, THE EXCESS ABOVE, OR THE DEFECT FROM, THE AVERAGES OF PREVIOUS YEARS.

1892.	DIRECTION OF WIND—DAYS.									Wind Force.	Hour of Sunshine.
	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.		
January .	1	0	0	-1	-1	-2	1	2	0	lb. p sq ft 0.92	- 7
February .	1	1	2	-1	-1	-3	0	1	0	-0.15	- 8
March . .	0	1	0	1	0	-1	-2	-1	2	-0.45	12
April . .	1	1	-1	-1	-1	-1	1	0	1	0.15	31
May . . .	0	0	-1	-1	1	1	1	-1	0	0.69	- 14
June . . .	2	1	0	-1	0	-1	-1	0	0	0.38	-33
July . . .	1	1	3	0	-1	-3	-1	0	0	0.21	-50
August . .	0	0	0	-2	0	0	1	1	0	0.47	-39
September.	-1	-1	0	-2	0	1	3	0	0	0.98	-29
October .	-4	3	0	-2	-2	-3	-2	2	0	0.41	-21
November	-2	-1	0	1	2	1	-1	-1	1	0.10	-26
December .	0	-1	1	-1	0	-2	1	1	1	-0.34	- 6
Year . .	7	5	4	-10	-3	-13	1	4	5	0.28	-190

Hence during 1892 there was a marked prevalence of northerly and easterly winds, which prevailed twenty-one days above their average, and a corresponding diminution of southerly and westerly, which blew twenty-six days under their average. This unusual prevalence of northerly and easterly winds was accompanied with an equally remarkable depression of temperature over all districts of the country. The diminution of temperature was greatest in the south-east, where it amounted on the mean of the year from 2°.0 to 2°.5; and least in the north-west and north, where it only slightly exceeded one degree, or only half of the diminution which occurred south of the Forth. The temperature was also, as usual in such cases, lower in inland districts than near the coasts in the same latitude.

The rainfall of all Scotland for the year was 7 per cent under the average, and, considered as an annual rainfall, was very irregularly distributed over the different districts. The fall was above the average over Lower Tweeddale; the counties of

Wigtown, Lanark, Inverness, Moray, and Nairn; the greater part of Ross-shire; the northern coasts of Caithness and Sutherland; and the south of Orkney. The excess amounted to 10 per cent in many places, and reached the maximum excess—21 per cent—at Elgin, due to the excessively heavy rainfalls of October. Over all other districts the rainfall fell short of the average. The greatest deficiency from the mean—39 per cent—was at Drumlanrig, and it was one-fifth short of the average at several places in the counties of Aberdeen, Perth, Fife, Dumbarton, Edinburgh, Berwick, and Dumfries.

These northerly and easterly winds were accompanied with a great, and from May onwards a persistent, diminution of sunshine. During the year the diminution of sunshine below the average was 190 hours. During the agricultural months of June, July, August, and September the deficiency amounted to 151 hours. It was only in March and April that the average sunshine was exceeded.

JANUARY.—The mean temperature of the month was $35^{\circ}.8$, or $1^{\circ}.4$ under the mean, the days being $1^{\circ}.0$ and the nights $1^{\circ}.9$ under the average. In all parts of the country, temperature was under the mean, the greatest deficiency being about $2^{\circ}.5$ at the more northern stations on the one hand, and the more southern on the other. In intermediate districts the deficiency was generally $1^{\circ}.5$ over a broad belt, bounded on the north by a line from Cromarty to Buchanness, and on the south by a line from Mull to the Mull of Kintyre.

The rainfall was 3.42 inches, or 0.55 inch less than the mean. Its distribution was very unequal. It was above the average to the north of a line from Fettercairn to Oban, and to the east of a line from Oban to Scourie, but under the average in other parts of the country. The excess above the mean was very large in Strathspey, amounting to 210 per cent at Elchies and 158 per cent at Aviemore. At a large number of places in the north it exceeded 50 per cent. The following give in per cents the largest deficiencies recorded: Drumlanrig, 67; Haddington, 66; Leith, 58; Dalnaspidal, Culross, Bothwell Castle, and Drum Park, 55.

FEBRUARY.—The mean temperature was $36^{\circ}.8$, or $1^{\circ}.6$ under the mean, the days being $1^{\circ}.1$ and the nights $2^{\circ}.0$ under the average. Temperature was again under the mean in all parts of the country, the deficiency being greater in eastern than in western districts. The lowest mean temperature, being $2^{\circ}.2$ under the mean, occurred over the coast district of the Moray Firth; and, on the other hand, the deficiency was least in the extreme west and north, where it was only about a degree.

The rainfall was 2.44 inches, or 0.55 inch less than the mean. Its distribution over the country was singularly irregular. It was above the average over the wide district lying between the Tweed and the Firth of Forth, and over a wider district, including the counties of Banff, Moray, Nairn, the greater part of Ross, Sutherland, Caithness, and Orkney. In all other districts it was under the average—in many cases largely so. The excess above the averages was 50 per cent at Cromarty, Scourie, and Thurso. On the other hand, the area of greatest deficiency of the rainfall is marked off by a line drawn successively through Ardnamurchan, Oban, Greenock, Stirling, Dunkeld, Dalnaspidal, Fort Augustus, Strome Ferry, and Rona,—the greatest deficiency from the average being 81 per cent at Kyleakin.

MARCH.—The mean temperature was $36^{\circ}3$, or $3^{\circ}1$ under the mean, the days being $2^{\circ}0$ and the nights $4^{\circ}5$ colder than usual. In the southern counties the deficiency of temperature exceeded $4^{\circ}0$, but the amount steadily diminished in advancing to north-north-westwards, till at north-west the temperature of March was the mean of the month. The depression of temperature, as usual in such cases, was greatest in inland situations, amounting to $4^{\circ}5$ at Drumlanrig and the Lower Tweed.

The rainfall was 1.15 inch, or 1.71 inch less than the mean. Everywhere over the country the rainfall was under the average, the deficiency at many places being from 80 to 95 per cent of the usual fall for March. This great deficiency occurred to the south of a line drawn from Skye to the head of the Tweed. On the other hand, the deficiency varied only from 9 to 30 immediately south of the Moray Firth—from Tarbetness to Kinnaird Head.

APRIL.—The mean temperature was $43^{\circ}2$, or $0^{\circ}8$ under the mean, the days being $0^{\circ}7$ above and the nights $2^{\circ}3$ under the average. Thus temperature in the daytime was, as respects the averages, $3^{\circ}0$ higher than during the nights, which was occasioned by the remarkably clear skies which prevailed and the large number of hours of sunshine above the average; and in the same connection the daily range of temperature was $4^{\circ}4$ above the mean. Over Argyllshire and islands adjacent to the south of Oban temperature was slightly above the mean, but in all other parts of the country below it, the greatest deficiency being in extreme northern and extreme southern districts respectively. Over the broad extent of country lying intermediate temperature was considerably higher.

The rainfall was 1.22 inch, or 0.98 inch less than the mean. Except at Kinnaird Head, Dunrobin, Dunnet Head, and the south

of Orkney, where the average was slightly exceeded, the rainfall was everywhere under the mean of April, the deficiency over nearly all districts being from 50 to 75 per cent of the usual rainfall.

MAY.—The mean temperature was $49^{\circ}.2$, or $0^{\circ}.3$ above the mean, the days being $1^{\circ}.0$ warmer and the nights $0^{\circ}.3$ colder than the average. The distribution over the country was very irregular. To the west of a line passing through Oban, Fort Augustus, Dunrobin, Wick, and over all Orkney and Shetland, temperature was under the average, the deficiency in Shetland exceeding $2^{\circ}.0$. It was slightly under the average in the north-east of Aberdeenshire and on the Berwickshire coast. Everywhere else temperature was above the mean, the greatest excess, about a degree, occurring in inland situations, indicated by a line curving through Tarbetness, Forres, Logie-Coldstone, Stronvar, Glasgow, and Stobo Castle.

The rainfall was 3.65 inches, or 1.37 inch above the mean. In the higher parts of Deeside and of Strathspey the fall was very slightly under the average. Over all other parts of the country the rainfall was in excess, and over widely extending districts excessively so. To the west of a line passing from Stornoway through Corran, Stirling, Paisley, Douglas Castle, and Cally, the rainfall was very greatly in excess, the excess rising in a number of cases to 175 per cent. In Orkney and Shetland the fall was generally double the average. To the east of the above line the fall was nowhere excessive, the excess over the average varying from a half to a fourth.

JUNE.—The mean temperature was $52^{\circ}.8$, or $2^{\circ}.0$ under the mean, the days being $1^{\circ}.8$ and the nights $2^{\circ}.1$ under the average. In all parts of the country temperature was under the mean, the greatest deficiency being in strictly inland situations, and least in south-western situations near the coast, the deficiency being about $2^{\circ}.5$ and $1^{\circ}.5$ respectively.

The rainfall was 3.11 inches, or 0.62 inch above the mean. To the south of the Grampians the rainfall was above average, except in the higher reaches of the Tweed, Annan, and Nith. To the north of the Grampians it was under the mean, except in parts of the counties of Aberdeen, Inverness, and Ross, in Sutherland, Caithness, and the southern islands of Orkney. At Strome Ferry and Ardnamurchan only half the average was collected, while the amounts were generally from 50 to 100 per cent in excess of the mean from the Grampians to the Cheviots, at the extreme south-western stations, in Sutherland, and south Orkney.

JULY.—The mean temperature was $54^{\circ}.8$, or $2^{\circ}.4$ less than the average, the days being $2^{\circ}.6$ and the nights $2^{\circ}.2$ under the average. The temperature was under the mean in all parts of the country. It is interesting to note that at the Ben Nevis Observatory temperature was $0^{\circ}.7$ above the average of July there. The greatest diminution of temperature, from $2^{\circ}.0$ to $3^{\circ}.0$, occurred at the more strictly eastern stations from Buchanness to the Tweed, and the least diminution, about a degree, in the west from Barrahead to Islay.

The rainfall was 2.56 inches, or 0.60 inch less than the mean. It was a little above the average round the shores of the Moray Firth, in the south of Orkney, along the west of Argyll, and in the central district of Ayrshire; elsewhere it was under the average. The amount was only about half the mean from the Grampians to the Cheviots, while, on the other hand, the greatest excess, 60 per cent above the mean, was recorded at Wick, and 56 per cent at the Rhinns of Islay. The distribution of the rainfall over Scotland in July was nearly in all respects the reverse of what obtained in June.

AUGUST.—The mean temperature was $55^{\circ}.6$, or $1^{\circ}.0$ less than the mean, the days being $1^{\circ}.2$ and the nights $0^{\circ}.8$ under the average. Temperature was nearly the mean of the month over a rather broad district of central Scotland, bounded on the east by the Tay, and on the west by a line drawn from Crinan to Bute; but elsewhere it was under the mean. The greatest diminution of temperature occurred at seaboard stations in the east, from the Firth of Tay to Shetland, the deficiency amounting to $1^{\circ}.7$ at Boyndie on the Moray Firth, and this was nearly reached at a good many places.

The rainfall was 5.34 inches, or 1.84 inch above the mean. Its distribution over the country was very unequal. At a number of seaboard stations on the Moray Firth, in the north of Orkney, in Shetland, and the Western Isles, it was slightly under the mean, but in all other districts above it, over many districts largely so. The greatest excess occurred in central districts south of the Grampians, rising in percentages above the averages to 168 at Glasgow, 140 at Falkirk, and above 100 at Paisley, Bothwell Castle, Douglas Castle, Ardwell, and Cargen.

SEPTEMBER.—The mean temperature was $50^{\circ}.2$ or $2^{\circ}.7$ less than the mean, the days being $2^{\circ}.5$ and the nights $2^{\circ}.9$ under the average. The diminution of temperature was greatest in the south and east, exceeding $3^{\circ}.0$ at many places, and least in the Northern Islands, where it was only about $1^{\circ}.5$. This

unseasonable cold extended high up in the atmosphere, as shown by the temperature at the Ben Nevis Observatory being $3^{\circ}.3$ under its average.

The rainfall was 4.01 inches, or 0.35 inch above the mean. Excepting Galloway and the upper ward of Lanarkshire, the rainfall of the whole of the western slope of Scotland was above the average, and largely so in many places. More than double the usual fall was collected at Glenquoich, Corran, Oban, and Inveraray. On the other hand, the whole of the eastern slope of the country had a rainfall under the average, except the upper districts of the Spey, Tay, and Forth. The greatest deficiency, exceeding in many places half the average, occurred over the broad district between the Tweed and the Sidlaw hills.

OCTOBER.—The mean temperature was $42^{\circ}.8$, or $3^{\circ}.8$ less than the mean, the days being $3^{\circ}.9$ and the nights $3^{\circ}.6$ under the average. The mean atmospheric pressure, instead of being, as usual, lower in the west than the east, was markedly higher in the west, accompanied inevitably with a great predominance of northerly and easterly winds, which prevailed on nineteen of the thirty-one days, which for the past thirty-six Octobers has only been equalled by the October of 1880, the temperature of which was $4^{\circ}.6$ less than its mean. This diminution of temperature was pretty evenly distributed over Scotland, with the exception of the Northern Islands, where the weather was a little less exceptionally severe. This is the fifth consecutive month of exceptionally low temperature, these having temperatures under the averages as follow: June, $2^{\circ}.0$; July, $2^{\circ}.4$; August, $1^{\circ}.0$; September, $2^{\circ}.7$; and October, $3^{\circ}.8$; or a monthly mean of $2^{\circ}.4$.

The rainfall was 4.69 inches, or $0^{\circ}.68$ inch above the mean. Its distribution, being brought about chiefly by easterly winds, was precisely the opposite to what obtained in the previous month. Over the whole of the eastern slope of the country, Sutherland, Caithness, Orkney, and Shetland, the rainfall was above the average, and over western districts under it. The amounts were very high between the Grampians and the Moray Firth, being in percentages above the average:—at Keith, 91; Gordon Castle, 154; Elgin, 144; Culloden, 134; Grantown, 128; Ellon, 120; and Buchanness, 113. On the other hand, less than half the usual October fall was collected in Morven.

NOVEMBER.—The mean temperature was $42^{\circ}.1$, or $1^{\circ}.5$ above the mean, the days being $1^{\circ}.8$ and the nights $1^{\circ}.1$ warmer than usual. Atmospheric pressure was, latitude for latitude, considerably lower in the west, as compared with the east, than usually happens, and consequently there was an excess of four

days southerly winds, under which temperature rose above the mean in all parts of the country. The least excess above the average, about $1^{\circ}0$, occurred in the districts south of the Firth of Forth, and the greatest excess, rising in some cases to $3^{\circ}0$, to the west and north of the great Caledonian valley.

The rainfall was 3.41 inches, or 0.43 inch less than the mean. It was above the average to westwards of a line passing through Pladda, Glasgow, Stronvar, Fort Augustus, Rona, and Monach; but under the average in all other parts of the country. The excess above the means was comparatively small, the largest being 44 per cent at Kyleakin. The deficiency amounted to half the average on the coasts of the Moray Firth, and between the Firth of Tay and the Cheviots.

DECEMBER.—The mean temperature was $34^{\circ}0$, or $3^{\circ}8$ less than the mean, the days being $3^{\circ}3$, and the nights $3^{\circ}6$ under the average. This diminution of temperature was very unequally distributed, the greatest diminution, upwards of $5^{\circ}5$, occurring in the south, at Marchmont, Milne Graden, Broomlands, Stobo, and Drumlanrig; and the least in Shetland, where, at North Unst, temperature was only one degree below the average. As happens in such cases, the cold was less severely felt on the coast than inland.

The rainfall was 1.98 inch, or 2.03 inches less than the mean. Everywhere in all parts of the country the rainfall was under the average, the greatest deficiency, falling to 80 per cent below the mean, occurring on the southern slopes of the Grampians. On the other hand, from Skye northward, including Orkney and Shetland, the rainfall was only from a fourth to a third deficient.

The harvest of 1892 was, in the midland districts, where higher temperatures ruled in July and August, from one to two weeks later than usual, and in the more northerly districts from three to four weeks.

Wheat was an average, or fully an average, crop in Galloway, Roxburghshire, the middle ward of Lanarkshire, the Lothians, part of Fife and Perthshire, Elgin, and Beaul; but elsewhere the crop was under the average. Barley was a very irregular crop, being an average, or fully an average, in Galloway, in the counties of Roxburgh, Peebles, Berwick, Mid-Lothian, Mid-Lanark, Elgin, Nairn, and parts of Aberdeen, Perth, Fife, and Stirling; but elsewhere under the average. Oats in the earlier districts, particularly, were a full average crop; but in almost all late districts the deficient sunshine, early frosts, and heavy persistent rains almost completely wrecked the crop, which earlier in the season promised to be one of the finest on record.

Potatoes were at least a good crop in eastern districts generally; but in the west, and in the counties of Dumbarton, Stirling, and Fife, the crop was mostly deficient. Disease appeared in some districts, but was nowhere very bad or widespread considering the wet character of the weather. The early frosts did no inconsiderable amount of damage to the crop.

Turnips were a heavy crop in north-eastern and in south-eastern districts, also in Skye, and parts of Renfrew and Argyll; but in other districts generally the crop was a poor one.

TABLE NO. 6.—NUMBER OF HORSES, CATTLE, SHEEP, AND PIGS IN EACH COUNTY OF SCOTLAND AS RETURNED ON JUNE 4, 1892.

COUNTIES.	HORSES (including Ponies).				CATTLE.			SHEEP.			Pigs.	
	Used solely for Agriculture, &c.	Unbroken Horses.	Mares kept solely for breeding.	Total.	Cows and Heifers in Milk or in Calf.	Other Cattle.		Total.	1 Year Old and above.	Under 1 Year.		
						2 Years and above.	Under 2 Years.					
1. Aberdeen	22,280	7,061	201	29,542	48,550	44,742	89,703	188,055	164,970	90,202	255,172	7,377
2. Argyll	4,497	2,927	274	7,698	28,166	15,467	28,876	62,008	728,832	813,221	1,042,043	8,389
3. Ayr	6,577	2,192	308	9,162	49,768	10,228	83,501	99,497	281,372	189,837	931,199	12,806
4. Banff	6,266	2,130	77	8,463	40,763	7,457	24,522	46,491	50,601	31,292	81,888	2,011
5. Berwick	4,248	1,178	228	5,652	8,531	6,881	7,612	16,995	167,808	142,577	909,880	8,734
6. Bute	4,988	400	50	5,438	8,839	2,128	4,087	10,018	84,780	17,260	62,080	616
7. Caithness	4,390	1,083	84	5,557	8,401	8,086	11,078	23,410	77,727	40,681	118,408	1,409
8. Clackmannan	494	190	8	687	1,065	925	1,489	4,079	8,395	4,898	13,233	1,108
9. Dumbarton	1,831	555	89	1,975	8,426	8,327	4,804	16,117	60,629	26,818	76,947	775
10. Dumfries	6,604	2,110	224	7,938	19,408	12,966	26,208	38,610	380,824	185,782	516,106	8,287
11. Edinburgh	8,697	816	81	4,494	18,171	4,165	4,451	21,777	110,478	76,961	186,454	5,748
12. Elgin	3,779	1,204	43	5,026	6,942	4,087	12,376	20,384	44,909	24,018	69,227	1,097
13. Forfar	7,779	2,132	189	10,100	11,919	16,764	16,482	46,155	65,813	43,413	100,220	4,681
14. Forth	8,207	1,840	116	10,253	19,651	17,146	20,141	48,938	102,530	60,883	163,869	6,820
15. Haddington	8,171	871	40	3,582	1,966	4,395	2,852	9,108	50,038	53,076	134,014	1,668
16. Inverness	6,954	2,010	111	9,091	22,274	8,548	23,748	38,585	478,277	190,895	677,072	2,792
17. Kinross	8,963	1,042	33	6,023	7,588	6,784	18,450	28,532	38,419	16,901	46,320	2,153
18. Kirkcaldy	787	847	15	1,009	1,880	1,677	8,844	6,901	21,694	15,616	87,210	374
19. Kirkcubright	9,807	1,960	217	6,014	16,010	18,791	18,278	46,085	260,602	181,480	992,022	5,748
20. Lanark	5,918	2,111	287	8,311	38,760	11,870	22,961	79,981	151,263	85,759	287,932	4,666
21. Leithgow	1,643	646	93	2,283	4,708	2,928	4,006	11,728	23,809	11,117	84,426	1,124
22. Nairn	991	286	18	1,295	2,094	924	8,989	6,997	10,440	6,375	22,715	490
23. Orkney	4,821	1,210	52	6,106	10,869	4,168	18,737	28,274	21,105	17,737	38,902	2,806
24. Shetland	802	2,131	2,509	5,262	8,063	5,501	5,287	18,900	66,185	56,428	91,818	8,082
25. Peebles	908	208	13	1,122	2,105	1,876	3,486	6,946	110,688	73,614	184,202	458
26. Perth	10,178	2,763	217	13,158	20,021	20,969	36,826	76,756	517,179	244,560	781,739	7,268
27. Renfrew	2,468	925	193	3,576	17,344	8,552	6,817	27,718	22,586	14,088	80,052	921
28. Ross and Cromarty	6,011	1,426	72	7,509	18,896	8,935	17,023	46,387	292,385	108,882	940,717	4,871
29. Roxburgh	8,668	509	134	4,811	5,092	6,078	7,460	18,150	288,534	231,108	504,642	8,820
30. Selkirk	586	184	16	786	1,890	1,800	1,570	9,084	100,164	72,284	172,448	408
31. Stirling	8,897	1,587	114	5,048	12,023	9,449	11,827	38,209	88,199	48,072	181,371	1,881
32. Sutherland	2,242	871	80	2,649	6,860	2,394	4,905	18,369	168,017	60,019	218,086	1,028
33. Wigtown	4,081	2,239	206	6,016	28,084	8,719	17,542	40,065	88,240	48,997	139,387	8,600
Total	146,289	47,506	6,814	200,100	445,004	276,878	503,844	1,221,726	4,889,108	2,661,389	7,548,447	112,015

TABLE No. 7.—QUANTITIES AND VALUES OF THE IMPORTS OF LIVE CATTLE, SHEEP, AND SWINE, 1890 AND 1891.

	QUANTITIES.		VALUES.	
	1890.	1891.	1890.	1891.
	No.	No.	£	£
Live cattle	642,696	507,407	10,505,525	8,581,574
Live sheep	358,458	344,504	606,312	663,015
Live pigs	4,086	5421	14,474	1,809
Total . . . . .	..	..	11,216,311	9,246,398

TABLE No. 8.—QUANTITIES AND VALUES OF THE IMPORTS OF BEEF, MUTTON, PORK, BACON, HAMS, FISH, EGGS, BUTTER, &c., 1890 AND 1891.

	QUANTITIES.		VALUES.	
	1890.	1891.	1890.	1891.
	Cwt.	Cwt.	£	£
Meat—				
Beef, fresh	1,854,593	1,920,511	3,923,015	4,038,495
Beef, salted	274,736	247,759	381,734	350,022
Beef, preserved otherwise	551,098	554,235	1,424,419	1,204,090
Mutton, fresh	1,656,419	1,662,904	3,447,776	3,282,001
Mutton, preserved	78,409	65,073	181,482	138,034
Pork, fresh	45,249	127,518	109,764	302,725
Pork, salted	254,337	226,798	341,424	295,932
Bacon	3,790,570	3,510,200	6,978,061	6,850,324
Hams	1,209,446	1,204,803	2,899,115	2,791,437
Unenumerated, salted or fresh	108,878	113,357	227,572	255,898
„ other than by salting	105,304	156,953	340,294	457,037
Total	9,924,549	9,700,210	20,224,656	19,860,895
Fish	2,395,974	2,365,370	2,811,455	2,809,949
Rabbits	145,645	103,685	308,110	226,351
Poultry and game (see value)			497,857	450,079
Butter	2,027,717	2,135,007	10,598,848	11,591,153
Margarine	1,079,856	1,285,490	3,083,241	3,558,203
Cheese	2,144,074	2,041,325	4,975,134	4,813,404
Lard	1,273,236	1,051,284	2,091,704	1,720,051
Eggs Thousands	1,234,950	1,276,397	3,426,806	3,506,622
Total . . . . .	..	..	27,885,155	28,742,272

TABLE No. 9.—QUANTITIES AND VALUES OF THE IMPORTS OF WHEAT AND WHEAT-FLOUR, 1890 AND 1891.

	QUANTITIES.		VALUES.	
	1890.	1891.	1890.	1891.
	Cwt.	Cwt.	£	£
Wheat	60,474,180	66,312,902	23,583,844	29,448,204
Wheat-flour	15,773,336	16,725,003	5,074,288	10,184,897
Total . . . . .	..	..	32,658,132	39,633,061

TABLE No. 10.—QUANTITIES AND VALUES OF THE IMPORTS OF BARLEY, OATS, INDIAN CORN, RYE, MEAL, &c., 1890 AND 1891.

	QUANTITIES.		VALUES.	
	1890.	1891.	1890.	1891.
	Cwt.	Cwt.	£	£
Barley	16,677,988	17,465,698	4,985,406	5,941,899
Oats	12,727,186	15,800,394	3,908,497	5,471,279
Maize	43,437,834	26,825,625	9,863,039	8,411,763
Peas	1,842,488	2,419,281	605,069	862,427
Beans	3,344,918	3,672,413	923,505	1,204,916
Rye	579,124	468,284	175,327	167,749
Buckwheat	100,940	177,892	30,355	56,179
Total . . . . .	..	..	20,561,202	22,121,219
Oatmeal	285,040	171,711	147,147	100,843
Other meals	377,939	476,638	118,103	167,263
Total . . . . .	..	..	265,250	268,106

TABLE NO. 11.—AVERAGE PRICES PER HEAD OF VARIOUS KINDS OF ANIMALS, DEAD MEAT, AND PROVISIONS IMPORTED INTO THE UNITED KINGDOM IN 1890 AND 1891.

Kind of Animals, Dead Meat, &c.	1890.	1891.
Animals—Horses each	£17 8 4	£19 18 11
" Oxen and bulls from all countries "	18 0 11	18 7 5
" Sheep, including lambs, from all countries "	1 18 10	1 18 6
" Pigs "	3 11 9	3 6 9
Bacon—From all countries per cwt.	1 16 10	1 17 11
Hams—From all countries "	2 7 5	2 6 4
Beef, salted—From all countries "	1 7 9	1 8 8
" fresh—From all countries "	2 2 4	2 2 1
Pork, salted—From all countries "	1 6 10	1 6 1
" fresh—From all countries "	2 8 6	2 7 6
Butter—From all countries "	5 4 6	5 8 7
Margarine "	2 17 1	2 17 7
Cheese—From all countries "	2 6 5	2 7 2
Potatoes—From all countries "	0 7 4	0 7 0
Eggs—From all countries per 120	0 6 8	0 6 7
Lard—From all countries per cwt.	1 12 10	1 12 9

TABLE NO. 12.—RETURN OF THE AVERAGE PRICES OF WOOL IN THE YEARS 1890 AND 1891.

Years.	Australian.	South African.	English Fleeces.
	Per lb. s. d.	Per lb. s. d.	Per lb. s. d. s. d.
1890	0 11	0 10½	0 10 to 1 1
1891	0 9½	0 9½	0 9½ " 1 2

[EDINBURGH

EDINBURGH CORN-MARKET GRAIN TABLES for WHEAT, BARLEY, OATS, and BEANS, showing the Quantity offered for Sale, the Quantity Sold, the Highest, Lowest, and Average Prices, also the Bushel-weights of the Highest and Lowest Prices of each kind of Grain for every Market-day, likewise the Results for every Month, and the final Result for the year 1892.

WHEAT.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel-weights for			
						Highest Price.		Lowest Price.	
			s. d.	s. d.	s. d.	lb.	lb.	lb.	lb.
1892									
Jan.	Imp. qr.	Imp. qr.							
0	258	220	41 0	35 0	37 11	63½		62	
13	868	858	38 6	34 0	36 7	63		59½	
20	388	284	37 6	33 0	35 6	63		60	
27	580	326	38 0	32 0	34 2	63½		59½	
	2,098	1,192	39 1	32 7	35 11				
Feb.									
3	294	214	35 6	30 0	34 4	62½		50	
10	314	211	34 0	29 0	33 5	62		57½	
17	292	287	30 0	28 0	33 5	62½		58½	
24	499	450	37 0	33 6	35 1	63		62	
	1,399	1,112	35 0	30 6	34 3				
March									
2	419	355	37 0	30 6	34 6	63½		60	
9	507	562	37 0	29 0	34 0	63		62½	
16	1,156	561	35 6	31 0	34 4	63		60½	60½
23	808	472	35 6	30 0	33 5	64		61½	63
30	595	465	34 0	28 6	31 8	63		60	
	3,780	2,415	36 1	29 10	33 9				
April									
6	154	70	34 6	30 0	31 8	64		61½	
13	175	86	34 6	31 6	32 11	62½		62	
20	481	481	33 6	30 0	32 2	62		61	
27	609	529	34 6	30 0	32 6	64½		63	
	1,419	1,166	34 0	30 5	32 4				
May									
4	1,308	1,089	34 3	29 0	32 7	64½		59½	60½
11	1,383	1,213	33 6	28 6	32 7	64		63½	
18	916	752	33 6	29 3	32 0	64		63	
25	1,380	1,209	33 6	26 0	31 10	64		62	
	5,031	4,207	33 9	28 6	32 3				
June									
1	856	705	33 0	28 0	31 1	64		59½	
8	981	766	32 6	26 0	31 7	62½		57½	
15	620	475	32 0	28 6	31 1	63½		61	
22	946	630	32 0	29 0	30 11	63½		63	
29	888	570	31 6	27 0	30 3	63		59½	63
	4,291	3,146	32 0	27 11	31 0				
July									
6	497	369	31 6	29 0	30 7	64		61	
13	296	175	31 3	27 0	30 1	64		58½	
20	199	199	31 6	27 0	29 8	63		55½	
27	212	182	33 0	30 9	31 10	63		63	
	1,204	925	31 11	28 9	30 6				

WHEAT—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for	
						Highest Price.	Lowest Price
1892 Aug.	Imp. qr.	Imp. qr.	s d	s d	s d	lb. lb.	lb. lb.
3	815	488	33 0	31 0	31 10	63½	62½ 63
10	1,211	817	33 0	31 0	31 7	64½	62 63½
17	1,177	706	32 0	27 0	30 7	64	58½
24	956	885	31 0	28 0	29 9	68 64½	62
31	1,252	737	30 6	26 0	29 1	68½	59½
	5,411	3,133	31 8	30 5	30 7		
Sept.							
7	894	571	37 6	28 0	29 1	68 62	62 62½
14	390	220	30 0	27 6	29 4	63½	61½
21	675	188	32 0	27 0	29 10	62	62
28	598	205	32 6	28 6	29 10	61½	61½
	2 537	1,184	30 8	28 0	29 5		
Oct							
5	801	456	35 0	28 0	30 4	62	59½
12	742	101	34 6	29 0	32 3	62	60½
19	827	366	33 0	26 0	30 7	64	62
26	1,317	522	35 0	27 0	30 10	63½	60½
	3,787	1,445	34 11	26 10	30 9		
Nov.							
2	1,579	584	37 0	28 0	30 4	64½	58½
9	1,848	514	37 0	21 6	29 0	64½	60
16	1,084	281	33 6	25 0	29 6	62½	58½
23	920	410	33 0	24 0	27 7	62½ 68	59½ 60½
30	684	368	33 0	22 6	27 2	62½	58½
	5,610	2,057	34 4	23 7	28 11		
Dec.							
7	511	338	31 0	28 6	27 1	62	59½
14	452	348	29 0	28 0	25 6	62½	60½
21	279	198	28 6	22 0	24 2	63	60
28	151	87	27 0	24 0	25 5	62 63½	62
	1,393	966	26 8	23 0	25 10		
Result for year	37,930	22,948	33 5	26 5	31 5		

BARLEY.

1892 Jan.							
6	1,874	1,422	33 0	25 6	30 5	56½	52½
13	3,147	2,085	34 0	27 0	30 0	57½	52½
20	2,965	1,428	33 6	23 0	20 2	56	55
27	3,311	1,197	33 6	25 6	29 8	56½	54½ 55½
	11,297	6,132	33 8	25 11	30 4		
Feb.							
3	1,947	1,039	33 0	24 3	29 2	57½	52½
10	1,987	872	33 0	24 0	29 8	56½	53½
17	1,941	1,192	32 0	24 9	28 7	57	53½
24	2,487	1,001	35 0	22 6	29 2	58	50½
	8,862	4,104	33 2	23 11	29 1		

BARLEY—continued.

Date	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel-weights for	
						Highest Price.	Lowest Price.
1892	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.	lb. lb.	lb. lb.
March							
6	2,278	1,107	32 6	25 0	28 0	56	54½
9	1,723	566	34 6	24 0	29 1	57	54½
16	1,576	872	34 0	23 6	28 1	57	54½
23	1,370	844	34 0	26 0	28 1	57	55½
30	1,207	770	34 0	24 6	29 4	57	53½
	8,154	4,159	33 6	25 2	28 5		
April							
6	650	529	31 0	25 0	28 9	56	52
13	496	329	30 0	25 9	27 5	57	56
20	439	303	30 6	26 6	28 8	56½	55½
27	321	201	30 0	28 0	28 11	56	50
	1,908	1,362	30 4	26 6	28 5		
May							
4	511	283	30 0	25 0	27 10	56 56½	54
11	350	321	30 0	26 0	27 6	56	54
18	718	519	30 0	26 3	27 11	57	53½
25	174	105	28 0	..	28 0	56 56½	54 ..
	2,253	1,228	29 0	25 8	27 9		
June							
1	76	41	27 0	25 9	26 5	56	52
8	45	30	20 0	28 0	28 4	56	56½
15	68	52	20 0	23 0	27 3	55½	55
22	190	67	28 0	27 6	27 11	56	56
29	179	..	..	..	..	..	..
	556	190	27 11	26 10	27 5		
July							
6	107	92	28 0	27 6	27 10	56	56
13	41	41	28 0	25 6	26 6	56	52½
20	47	47	28 0	26 6	27 3	55½	55
27	18	8	26 6	..	26 6	54½	..
	213	183	27 10	26 5	27 4		
Aug.							
3	28	28	28 0	27 6	27 10	56	54½
10	114	44	28 0	21 0	25 5	56	48
17	85	25	26 6	..	26 6	54	..
24	170	31	28 0	26 6	27 5	56½	53½
31	40	35	26 6	..	26 6	54	..
	437	153	27 3	24 3	26 7		
Sept.							
7	200	102	30 0	26 6	28 2	56	55
14	1,259	917	29 0	26 6	28 2	57	55
21	1,695	1,307	30 0	24 6	27 10	57	55½
28	2,380	1,095	30 0	21 0	25 10	56½	53½
	5,534	3,421	29 5	23 10	27 4		
Oct.							
5	1,149	957	29 3	22 9	26 11	56½	55
12	776	480	30 0	28 0	26 6	57½	53
19	866	759	30 0	21 0	27 0	56 57½	53
26	991	710	31 6	22 0	27 3	57½	53½
	3,782	2,906	30 0	22 0	26 11		

BARLEY—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for			
						Highest Price.		Lowest Price.	
1892	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.	lb.	lb.	lb.	lb.
Nov.									
2	1,202	792	29 6	21 0	27 3	55	56½	53½	
9	1,406	665	30 0	22 0	27 5	56	57½	51½	
16	2,800	947	30 0	20 0	27 1		56	52½	
23	2,806	1,538	30 6	19 0	26 3		56	51½	
30	1,920	1,160	28 6	10 0	25 7		56½	48	
	9,684	5,102	29 5	19 10	26 7				
Dec.									
7	1,737	1,307	29 0	20 0	25 11	55½	56	54	
14	1,900	1,405	29 0	16 0	25 11		57½	50½	53½
21	1,886	814	29 0	16 0	24 7		56	50	
28	1,594	970	29 0	18 0	26 0	56	50½	52	
	6,417	4,496	29 0	17 1	25 8				
Result for year	38,547	33,441	29 11	24 2	27 11				

OATS.

1892							
Jan.							
6	2,266	1,145	26 6	20 6	24 2	43½	44½
13	3,850	2,780	26 6	20 0	23 8	42	40½
20	3,599	2,301	27 6	20 6	23 8	43½	40
27	3,624	2,140	28 0	20 6	23 10	43½	40
	13,339	8,366	26 11	20 3	23 9		
Feb.							
3	3,029	1,627	27 6	19 0	23 10	45	39
10	3,064	1,863	28 0	20 6	24 0	44½	39
17	4,289	2,288	27 6	20 0	23 4	45	30½
24	5,028	1,953	28 6	20 0	23 8	43½	41
	16,610	7,687	27 9	19 11	23 8		40
March							
2	4,939	2,007	28 0	19 6	23 8	45	38½
9	5,269	3,046	28 6	20 0	24 2	45	40
16	4,584	2,716	29 0	21 0	24 10	44½	40
23	3,892	2,480	28 6	21 3	24 11	44	39
30	3,923	1,730	28 6	22 0	25 2	44½	39½
	22,606	11,979	28 6	20 9	24 6		40
April							
6	4,007	1,400	27 6	21 0	24 10	43	45½
13	3,537	921	27 0	20 3	24 10	45	39
20	2,436	1,866	27 6	22 0	24 9	45½	39
27	2,096	1,775	28 9	23 0	24 8	45½	41
	12,786	5,452	27 7	22 1	24 9		42
May							
4	2,459	1,600	28 0	22 0	25 10	44	45½
11	2,362	844	28 3	22 6	25 10	45½	39½
18	2,858	1,192	28 0	22 0	25 10	44½	45½
25	1,889	1,262	28 0	24 6	26 0	44	39½
	9,518	4,898	28 0	23 4	25 11		42½

OATS—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for			
						Highest Price.		Lowest Price.	
1892						lb.	lb.	lb.	lb.
June	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.				
1	1,402	729	29 3	24 6	26 10	45½		41	
8	2,498	1,270	29 3	24 0	26 2	45½		41	
15	2,841	1,265	29 3	24 6	26 8	44½		42	
22	2,216	731	29 6	24 9	27 4	46		42	
29	2,798	1,172	29 0	22 0	26 7	45½		40	
	11,255	5,167	29 3	23 6	26 8				
July									
6	2,050	1,304	29 6	23 6	26 4	46		40	
18	1,866	714	29 0	23 0	26 2	44½ 46		40	
20	1,560	1,191	30 0	23 6	26 7	45		40	
27	1,321	1,017	30 6	24 3	27 0	45½		41½	
	6,797	4,226	29 7	23 9	26 6				
Aug.									
8	1,290	920	30 9	25 9	28 1	42½		41	
10	1,218	811	31 0	26 0	29 1	46		41	
17	1,864	998	31 0	25 9	29 10	44½ 46		42	
24	1,249	715	31 0	26 6	28 3	44½		42	
31	1,357	771	32 0	24 0	28 8	44½		42	
	6,978	3,915	31 1	25 6	28 10				
Sept.									
7	1,249	604	31 6	26 0	29 8	45 46		42	
14	1,721	1,216	32 0	20 6	26 3	46		40	
21	2,456	1,490	32 0	20 0	24 5	46		40	
28	2,136	1,587	28 0	20 6	23 1	43		41	
	7,562	4,897	31 5	21 3	25 1				
Oct.									
5	1,148	1,023	29 6	19 0	24 5	44½ 45½		39½	
12	1,110	1,006	30 0	19 0	25 8	44		41½	
19	2,086	1,801	27 6	18 0	24 6	44 44½		39½	
26	3,008	2,056	28 0	17 0	23 9	45 45½		40	
	7,308	5,686	28 2	17 6	24 5				
Nov.									
2	2,047	1,679	28 6	17 0	23 10	44½		41	
9	3,516	2,835	29 6	17 0	23 9	42		40	
16	3,328	1,624	28 0	15 0	23 7	45 45½	39½ 40		
23	4,391	2,007	28 6	15 0	23 3	46½		39½	
30	3,868	2,051	29 0	15 0	21 11	45 45½	39½ 41		
	17,145	10,196	29 4	15 5	23 1				
Dec.									
7	3,560	1,441	29 0	14 6	22 3	42		37½	
14	3,883	2,283	28 0	14 0	22 4	43		40	
21	3,682	1,508	28 0	14 0	20 7	43		36	
28	2,926	1,817	27 0	14 0	21 5	44½		37½	
	14,031	7,047	27 9	14 1	21 9				
Result for year	145,885	79,516	28 11	21 3	24 6				

BEANS.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for			
						Highest Price.		Lowest Price.	
1892						lb.	lb.	lb.	lb.
Jan.	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.				
6	87	86	36 8	32 6	34 7	66	68½		
13	155	121	36 0	31 6	34 8	63	62		
20	157	137	30 6	32 6	34 9	65	65½	65	63
27	146	44	36 6	35 0	35 3	64½	64½	65	66½
	545	338	36 8	33 4	34 7				
Feb.									
3	350	188	37 6	33 6	34 11	64½	63		
10	296	151	38 6	31 0	35 8	65	63½		
17	480	309	40 0	32 0	34 11	64½	63		
24	405	218	41 0	32 0	33 9	65	62		
	1,531	866	38 10	32 0	34 8				
March									
2	316	115	35 6	32 0	34 1	65½	63		
9	256	204	38 0	31 0	34 5	65	62		
16	109	80	38 6	34 6	36 2	65	63½		
23	151	59	37 6	35 6	36 6	65½	63		
30	94	23	38 6	34 0	36 7	67½	63½		
	926	481	37 11	33 3	35 0				
April									
6	35	6	38 0	..	38 0	65	..		
13	32	21	37 9	..	37 9	65	..		
20	58	16	37 3	35 3	35 9	63	64½		
27	50	20	37 0	..	37 0	63½	..		
	175	63	37 5	35 3	37 0				
May									
4	51	..	..	..	..	..	..
11	38	88	38 3	37 3	37 6	65½	63½		
18	26	26	38 6	38 0	38 1	63½	66½		
25	58	51	38 6	37 0	38 1	65½	66½		
	173	116	38 6	37 5	37 11				
June									
1	134	10	36 6	..	36 6	63½	..		
8	70	18	36 6	..	36 6	63	..		
15	133	21	36 3	35 9	35 11	63½	63		
22	104	10	36 6	..	36 6	64½	..		
29	89	2	36 6	..	36 6	63	..		
	483	61	36 6	35 9	36 8				
July									
6	90	..	..	..	..	..	..
13	74	15	36 3	36 0	36 2	63	63		
20	46	16	37 6	35 9	36 6	64	63		
27	29	29	35 6	..	35 6	63	63½		
	289	60	36 0	35 10	35 11				
Aug.									
3	63	5	37 0	..	37 0	66	..		
10	18	..	..	..	..	..	..
17	20	20	38 6	..	38 6	66½	..		
24	93	35	38 0	37 0	37 3	65½	64		
31	63	18	37 6	..	37 6	63	..		
	257	73	37 11	37 0	37 8				

BEANS—continued.

Date.	Quantity offered for Sale.	Quantity Sold.	Highest Price.	Lowest Price.	Average Price.	Table of Bushel- weights for			
						Highest Price.		Lowest Price.	
1892						lb.	lb.	lb.	lb.
Sept.	Imp. qr.	Imp. qr.	s. d.	s. d.	s. d.				
7	78	20	37 6	..	37 6	63	..		
14	29	3	39 6	..	39 6	65½	..		
21	..	..	..	..	..	..	..
28	18	18	39 6	..	39 6	63	..		
	125	41	38 6	..	38 6				
Oct.									
5	79	56	40 0	37 0	37 7	63	..	63	..
12	63	..	..	..	..	..	..	..	..
19	69	25	36 0	..	36 0	63	..	..	..
26	33	4	39 0	..	39 0	63	..	..	..
	243	85	36 11	37 0	37 2				
Nov.									
2	58	1	40 0	..	40 0	63	..	..	..
9	35	..	..	..	..	..	..	..	..
16	24	1	39 0	..	39 0	63	..	..	..
23	26	6	34 0	..	34 0	63	..	..	..
30	20	..	..	..	..	..	..	..	..
	168	8	35 5	..	35 5				
Dec.									
7	25	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..
28	6	..	..	..	..	..	..	..	..
	31	..	..	..	..
Result for year	4,891	2,196	37 6	34 4	35 4				

	s.	d.		s.	d.		s.	d.		s.	d.		s.	d.		s.	d.
1818	28	0	to	30	0		not quoted.			8	0	to	10	0		8	0
1819	25	0	"	27	0		15	0	to	17	0		10	6	"	12	0
1820	20	0	"	23	0		16	0	"	17	0		10	0	"	11	0
1821	18	0	"	20	0		14	0	"	18	0		7	6	"	8	0
1822	12	6	"	18	0		8	0	"	8	6		4	6	"	0	0
1823	13	6	"	18	0		7	0	"	10	6		5	6	"	6	0
1824	14	0	"	19	0		7	0	"	9	0		4	6	"	6	0
1825	20	0	"	32	0		15	0	"	19	0		9	0	"	10	6
1826	17	6	"	21	6		13	0	"	15	0		7	0	"	7	6
1827	15	0	"	24	0		not quoted.						7	0	"	8	0
1828	18	0	"	27	6		12	0	to	15	0		7	0	"	8	8
1829	18	0	"	24	0		12	6	"	14	0		7	0	"	8	6
1830	15	0	"	21	0		8	0	"	11	0		6	0	"	6	9
1831	18	0	"	25	0		9	0	"	13	0		7	0	"	8	0
1832	19	0	"	24	0		11	0	"	16	0		7	0	"	9	0
1833	22	0	"	31	0		13	6	"	20	0		8	0	"	11	8
1834	22	0	"	31	0		18	6	"	21	0		9	0	"	11	6
1835	22	0	"	27	6		18	0	"	20	6		8	0	"	11	0
1836	24	0	"	31	6		16	0	"	19	0		10	0	"	14	0
1837	10	0	"	28	0		14	0	"	19	0		10	0	"	18	0
1838	23	0	"	30	6		17	0	"	22	0		12	0	"	14	0
1839	23	0	"	31	0		14	0	"	19	0		0	0	"	18	0
1840	24	0	"	33	0		15	0	"	23	0		7	0	"	11	6
1841	23	0	"	30	0		14	0	"	22	0		8	0	"	12	0
1842	22	6	"	28	0		13	0	"	17	0		7	6	"	10	0
1843	19	0	"	25	0		8	0	"	13	0		5	0	"	8	0
1844	21	0	"	59	0		10	0	"	16	0		8	0	"	10	6
1845	23	0	"	33	0		13	0	"	20	0		8	0	"	13	0
1846	24	0	"	33	6		14	6	"	21	6		10	0	"	14	6
1847	24	0	"	35	0		18	0	"	24	0		11	6	"	15	0
1848	23	0	"	34	6		13	0	"	28	0		11	6	"	15	0
1849	21	0	"	30	2		12	0	"	21	0		0	0	"	14	0
1850	20	6	"	29	6		12	0	"	20	0		8	0	"	13	0
1851	21	6	"	31	0		13	0	"	21	0		8	9	"	14	0
1852	21	0	"	32	0		15	0	"	23	0		8	0	"	14	0
1853	26	6	"	38	0		17	0	"	28	6		9	0	"	17	0
1854	25	0	"	36	0		17	0	"	26	0		9	0	"	16	6
1855	23	6	"	36	0		16	0	"	25	0		10	0	"	17	0
1856	22	0	"	35	6		15	6	"	24	0		10	0	"	15	0
1857	24	0	"	36	0		14	6	"	26	0		10	6	"	14	6
1858	24	0	"	34	6		14	0	"	24	6		10	6	"	14	0
1859	25	0	"	34	6		16	0	"	25	0		10	3	"	14	9
1860	26	0	"	38	0		17	6	"	27	6		12	6	"	17	6
1861	25	0	"	38	6		16	0	"	28	0		9	0	"	16	0
1862	27	0	"	37	6		17	6	"	28	0		10	0	"	16	0
1863	25	0	"	38	6		19	0	"	28	6		10	6	"	16	0
1864	31	0	"	41	0		21	0	"	31	6		14	0	"	18	0
1865	32	6	"	44	0		22	6	"	33	6		14	6	"	30	0
1866	37	0	"	50	0		29	0	"	42	6		15	0	"	26	0
1867	26	0	"	58	0		19	0	"	25	6		12	0	"	16	0
1868	30	0	"	32	0		15	6	"	31	0		7	6	"	13	0
1869	28	0	"	38	0		15	0	"	29	6		7	6	"	14	0
1870	35	6	"	43	0		18	0	"	38	0		10	0	"	17	0
1871	36	6	"	40	0		22	0	"	38	6		14	0	"	30	0
1872	45	0	"	56	0		32	0	"	42	0		16	0	"	32	0
1873	42	0	"	51	0		25	0	"	42	0		15	6	"	32	0
1874	33	6	"	44	6		21	0	"	36	0		12	0	"	17	0
1875	38	0	"	48	6		21	0	"	34	0		13	6	"	23	6
1876	40	0	"	52	6		23	0	"	30	0		13	6	"	25	0
1877	41	0	"	51	0		25	0	"	37	0		15	0	"	24	0
1878	35	6	"	48	0		23	6	"	35	0		14	0	"	22	0
1879	34	0	"	44	0		21	0	"	34	0		14	0	"	20	0
1880	30	0	"	43	6		20	0	"	30	0		12	6	"	20	0
1881	32	0	"	45	6		29	0	"	34	0		14	0	"	30	0
1882	40	0	"	51	0		30	0	"	40	0		14	0	"	30	6
1883	44	0	"	55	6		34	6	"	48	6		15	6	"	33	0
1884	36	0	"	47	6		20	6	"	41	6		12	6	"	30	0
1885	30	0	"	38	0		24	0	"	31	0		12	0	"	18	0
1886	32	0	"	40	0		21	0	"	29	0		12	6	"	19	0
1887	29	0	"	36	0		18	0	"	26	0		11	0	"	16	6
1888	30	0	"	38	0		19	0	"	27	0		12	0	"	17	6
1889	36	0	"	44	0		24	0	"	32	0		14	0	"	22	0
1890	31	0	"	40	0		22	0	"	30	0		12	6	"	20	0
1891	27	0	"	38	0		16	0	"	25	0		9	0	"	16	0
1892	22	0	"	30	6		13	0	"	22	0		5	0	"	11	0

Year.	Wethers.				Ewes.				Lambs.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1819	22	0	to	24	0	12	0	to	15	0	8	0
1820	20	0	"	23	3	15	6	"	17	0	7	0
1821	18	0	"	20	0	12	0	"	18	0	6	0
1822	11	6	"	13	6	5	6	"	6	0	4	6
1823	12	0	"	16	0	5	0	"	6	6	4	0
1824	9	6	"	13	6	6	0	"	7	0	4	0
1825	22	0	"	26	0	11	0	"	18	6	6	0
1826	15	0	"	17	0	8	0	"	9	0	4	6
1827	14	0	"	18	6	7	0	"	10	0	6	0
1828	15	0	"	20	0	8	0	"	11	0	5	0
1829	14	0	"	18	0	9	0	"	10	0	6	0
1830	9	6	"	13	0	4	0	"	6	0	4	6
1831	13	0	"	17	0	5	0	"	7	6	5	0
1832	14	0	"	18	0	7	0	"	11	6	6	0
1833	16	0	"	24	0	7	6	"	12	0	6	6
1834	16	0	"	22	0	10	0	"	13	0	6	0
1835	15	0	"	18	9	10	0	"	13	0	7	0
1836	15	0	"	21	0	9	0	"	12	0	8	6
1837	13	0	"	16	0	8	0	"	12	0	8	0
1838	15	0	"	20	6	10	0	"	13	0	8	0
1839	15	0	"	22	0	10	0	"	12	0	not quoted.	
1840	15	0	"	22	6	11	0	"	12	0	7	0
1841	16	0	"	20	0	9	0	"	11	0	7	0
1842	14	0	"	19	0	7	6	"	8	0	6	0
1843	not quoted.					4	9	"	6	6	5	6
1844	15	0	to	21	0	6	6	"	10	0	not quoted.	
1845	14	0	"	23	0	8	0	"	12	0	5	0
1846	13	0	"	24	0	10	0	"	13	0	5	0
1847	20	6	"	25	0	10	0	"	14	0	8	0
1848	20	0	"	24	0	11	3	"	13	0	8	6
1849	not quoted.					not quoted.					8	6
1850											7	0
1851	17	6	to	28	0	9	0	to	12	0	7	0
1852	18	6	"	22	0	9	6	"	12	0	7	0
1853	23	0	"	27	0	14	6	"	16	6	6	6
1854	20	0	"	26	0	11	0	"	16	6	8	0
1855	23	6	"	26	6	14	0	"	16	0	10	0
1856	17	0	"	24	0	10	0	"	20	0	7	6
1857	20	0	"	29	0	10	6	"	15	0	9	3
1858	20	0	"	27	6	9	0	"	18	9	8	3
1859	20	0	"	25	0	10	0	"	14	0	8	9
1860	21	0	"	27	3	11	0	"	16	0	10	0
1861	21	0	"	29	0	12	0	"	22	0	6	3
1862	16	9	"	27	0	12	0	"	18	8	6	0
1863	20	0	"	30	6	13	0	"	16	0	8	0
1864	25	0	"	30	0	15	0	"	19	0	10	0
1865	15	6	"	32	6	15	0	"	25	0	10	0
1866	31	6	"	40	0	20	0	"	36	0	18	6
1867	20	0	"	30	6	14	0	"	22	0	7	6
1868	20	0	"	26	0	10	6	"	18	6	7	0
1869	22	0	"	28	0	11	0	"	14	0	6	0
1870	27	0	"	32	6	13	0	"	22	0	8	0
1871	23	0	"	37	0	13	0	"	28	0	11	0
1872	31	6	"	45	0	18	0	"	32	0	12	6
1873	28	0	"	39	0	16	6	"	27	0	7	0
1874	25	0	"	35	0	13	0	"	20	0	7	0
1875	26	6	"	37	6	15	0	"	21	3	9	6
1876	30	0	"	40	0	19	0	"	24	0	13	0
1877	35	0	"	38	9	18	0	"	25	0	13	6
1878	30	0	"	36	0	17	0	"	28	0	12	0
1879	25	0	"	35	9	16	0	"	24	0	10	6
1880	25	0	"	38	0	16	6	"	22	6	10	0
1881	30	0	"	39	0	15	0	"	23	0	10	0
1882	33	0	"	46	0	20	0	"	23	0	12	6
1883	36	0	"	50	6	24	6	"	33	0	14	0
1884	29	0	"	43	6	19	6	"	28	0	12	0
1885	24	0	"	34	0	13	0	"	22	6	10	0
1886	25	0	"	34	0	12	0	"	22	0	10	6
1887	22	0	"	30	0	11	0	"	19	0	8	0
1888	22	0	"	32	0	13	0	"	24	0	10	0
1889	26	0	"	40	0	18	0	"	29	0	13	0
1890	24	0	"	37	0	14	0	"	27	0	10	6
1891	21	0	"	37	0	10	0	"	24	0	7	6
1892	16	0	"	28	6	6	0	"	17	0	8	0

TABLE No. 3.—PRICE OF WOOL, PER STONE OF 24 LB., SINCE 1818.

Year.	Laid Cheviot.		White Cheviot.		Laid Highland		White Highland.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1818	40 0	to 42 2	..	..	20 0	to 22 6	..	..
1819	21 0	" 22 0	..	..	10 0	" 10 3	..	..
1820	20 0	" 22 0	..	..	9 0	" 10 0	..	..
1821	18 0	" 20 0	..	..	9 0	" 10 0	..	..
1822	12 6	" 14 6	..	..	5 0	" 6 6	..	..
1823	9 0	" 10 6	..	..	5 0	" 5 9	..	..
1824	13 6	" 15 0	..	..	6 0	" 6 3	..	..
1825	10 6	" 22 0	..	..	10 0	" 10 6	..	..
1826	11 0	" 14 0	..	..	5 0	" 5 6	..	..
1827	11 0	" 14 0	..	..	5 6	" 6 9	..	..
1828	8 0	" 11 0	..	..	5 6	" 6 0	..	..
1829	8 6	" 11 0	..	..	4 3	" 0 0	..	..
1830	9 6	" 11 0	..	..	4 6	" 5 0	..	..
1831	17 0	" 20 0	..	..	7 6	" 8 6	..	..
1832	14 0	" 16 0	..	..	7 0	" 7 6	..	..
1833	18 0	" 20 7	..	..	10 0	" 11 0	..	..
1834	21 0	" 24 6	..	..	5 6	" 7 0	..	..
1835	19 0	" 20 6	..	..	9 6	" 10 8	..	..
1836	21 0	" 25 0	..	..	10 0	" 14 0	..	..
1837	12 0	" 14 0	..	..	7 0	" 7 3	..	..
1838	19 0	" 22 6	..	..	0 0	" 10 0	..	..
1839	18 0	" 20 0	..	..	8 0	" 12 0	..	..
1840	15 0	" 0 0	..	..	7 0	" 0 0	..	..
1841	15 0	" 10 9	..	..	6 0	" 7 5	..	..
1842	12 6	" 14 0	..	..	not quoted.		..	..
1843	9 0	" 11 6	..	..	5 0	to 6 0	..	..
1844	15 0	" 18 0	..	..	not quoted.		..	..
1845	14 6	" 17 6	..	..	7 6	to 8 6	..	..
1846	12 0	" 14 6	..	..	8 0	" 8 6	..	..
1847	12 6	" 14 0	..	..	not quoted.		..	..
1848	9 6	" 11 0	..	..	4 9	to 0 0	..	..
1849	12 0	" 16 6	..	..	6 0	" 6 3	..	..
1850	15 0	" 17 6	..	..	8 0	" 8 6	..	..
1851	12 0	" 16 0	..	..	8 0	" 9 3	..	..
1852	18 0	" 15 0	..	..	8 0	" 9 0	..	..
1853	19 0	" 22 0	..	..	11 0	" 12 6	..	..
1854	12 0	" 15 0	..	..	7 6	" 8 6	..	..
1855	14 6	" 19 0	..	..	8 6	" 0 0	..	..
1856	19 0	" 21 6	..	..	11 0	" 0 0	..	..
1857	19 0	" 24 0	..	..	13 0	" 14 3	..	..
1858	15 0	" 17 0	..	..	8 9	" 10 0	..	..
1859	18 6	" 24 0	..	..	10 9	" 11 6	..	..
1860	22 0	" 32 6	37 0	to 38 0	10 0	" 11 3	..	..
1861	19 6	" 27 0	from 30s. upwards		not quoted.		..	..
1862	19 6	" 26 0	30 0	to 37 0	11 0	to 10 0	..	..
1863	25 6	" 31 0	38 0	" 42 0	15 3	" 17 6	..	..
1864	31 0	" 39 0	47 0	" 54 0	17 6	" 20 0	..	..
1865	28 0	" 30 0	44 0	" 45 0	15 0	" 17 0	..	..
1866	24 0	" 30 6	30 0	" 38 0	14 0	" 16 0	..	..
1867	16 0	" 21 6	not quoted.		not quoted.		..	..
1868	19 0	" 26 0	28 0	to 32 0	8 6	to 9 0	..	..
1869	18 0	" 26 6	not quoted.		8 6	" 10 0	..	..
1870	15 0	" 23 6	25 0	to 26 0	9 6	" 0 0	..	..
1871	20 0	" 26 6	30 0	" 34 6	12 0	" 15 0	..	..
1872	26 0	" 37 6	40 0	" 48 0	18 0	" 21 0	..	..
1873	17 0	" 18 0	34 0	" 40 0	9 0	" 12 0	..	..
1874	18 6	" 26 6	30 0	" 34 0	9 6	" 13 0	..	..
1875	25 0	" 32 0	34 6	" 38 0	12 6	" 16 0	..	..
1876	20 0	" 24 0	30 0	" 34 6	9 6	" 12 0	..	..
1877	20 9	" 26 0	29 0	" 30 0	10 0	" 12 0	..	..
1878	18 9	" 25 0	27 0	" 32 0	8 6	" 11 6	..	..
1879	15 0	" 17 0	prices very low.		7 0	" 0 0	..	..
1880	20 0	" 24 0	30 0	to 32 0	10 6	" 11 6	14 0	to 15 0
1881	17 0	" 21 0	27 0	" 30 0	5 0	" 9 6	12 0	" 13 0
1882	14 0	" 18 0	27 6	" 28 0	7 6	" 9 0	13 0	" 14 0
1883	13 0	" 18 0	26 0	" 25 0	6 6	" 8 6	11 6	" 12 6
1884	13 0	" 18 0	26 0	" 28 0	6 6	" 8 6	11 6	" 12 6
1885	12 0	" 17 0	22 6	" 26 0	6 0	" 8 0	11 6	" 12 0
1886	13 0	" 18 0	23 0	" 27 6	6 8	" 8 6	11 6	" 12 0
1887	14 0	" 22 0	23 0	" 28 0	7 0	" 9 0	11 6	" 18 0
1888	13 0	" 30 0	23 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1889	13 0	" 18 0	24 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1890	13 0	" 18 0	24 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1891	12 6	" 18 0	22 0	" 28 0	7 0	" 9 0	11 0	" 12 6
1892	12 0	" 18 0	20 0	" 28 0	7 0	" 8 6	10 6	" 12 0

CHEMICAL DEPARTMENT.

PUMPHERSTON EXPERIMENTAL STATION.

REPORT ON GRASS EXPERIMENTS, 1892.

By Dr A. P. AITKEN, Chemist to the Society.

THE years 1891 and 1892 will be remembered as the two worst consecutive seasons for growing grass in this generation. During April 1892 the thermometer was below the freezing-point on twenty days, and snow fell on four days. Owing to the late and long-continued frost there was almost no growth of grass in April, and the manures could not be applied to the station without the risk of injury. It was not till near the middle of May that it was considered safe to apply any nitrogenous manures; and even after the manures were applied a cold frosty night occurred, which browned the leaves of the grass. The rainfall in May was 3.66 inches during sixteen days, and in June 3.35 inches during fifteen days. The warmest days of the summer were on the 8th and 9th of June, when the temperature reached 78 deg., but the latter half of the month was very cold. Only 1.36 inches of rain fell in July, and the temperature was much below average; but the dry weather of that month enabled the hay crop to be got in under very favourable conditions. It was cut upon the 15th and weighed on the 19th July.

Despite the cold weather, there was a greater growth of grass on the manured section of the station in 1892 than in 1891, when the herbage had both cold and drought to contend with.

The weights of the crop taken from the manured plots are given on Table IV., but we shall first direct attention to the results on Tables II. and III., which refer to section B of the station, that has been cropped for seven years in succession without the application of any manures. Table II. shows the impoverishment of the land from constant cropping without manure. The

land on section B is now so far reduced that it does not appear as if any further information could be obtained by continuing the exhaustion process, and we may now gather from it the results of the five seasons of grass growing, and see what information they convey on the subject of exhaustion.

The quantities of hay taken from section B in the years 1888 to 1892 do not indicate the rate at which the land was being gradually exhausted of its fertility, because the weight of the hay crop, especially upon unmanured land, depends in the first place upon the kind of season. The amount of the rainfall in April and May, and the amount of warmth in June and July, have a far greater effect on the hay crop than the residual fertility derived from the application of light manures. Moreover, the crop of 1891 had the advantage of an application of nitrate of soda at the rate of 1 cwt. per acre, for the purpose of bringing more prominently into view the residual fertility derived from the phosphates and potash salts applied in former years. It was intended to repeat the application of nitrate in 1892, but as that year would probably be the last during which the experiment would be continued, it was resolved to take another crop from the section without applying any manure.

We may therefore limit our attention to the average results of the five years' cropping, as shown on Table III., alongside of which is given the total quantities of dry matter per acre taken from the plots during the two previous rotations, when the manures were applied whose available residues the hay crops were intended to indicate.

Phosphates.—In the first place as regards phosphates, we see that a larger amount of available residues were found on those plots which received their phosphates in the soluble form than on those to which finely-ground phosphates were applied. We may safely say that one-tenth more hay was grown from the residues of the dissolved phosphates than from the same phosphates finely ground, and applied so as to give in each case the same amount of phosphoric acid per acre.

On comparing the two columns of Table III. it is, moreover, seen that the phosphate plots—6, 8, and 10,—which produced the largest crops from the residual manures, also produced the largest crops during the two rotations when the manures were applied. This result seems at variance with the opinion commonly held that insoluble phosphates, while they may not produce so marked an effect upon the crop to which they are applied, leave, nevertheless, a larger store of fertility in the soil for the benefit of succeeding crops. It may, however, be very fairly argued that the greater amount of residual fertility found in the plots which formerly produced the largest crops is not due to the solubility of the phosphates applied, or indeed to the

effect of the phosphates at all, but mainly, if not entirely, to the larger amount of root residues in the soil, which have improved the condition of the land, and yielded by their decay not only phosphatic, but also potassic, and especially nitrogenous, matters, which have a marked effect on the grass crop. That may be admitted, and it may be also admitted that there is still a larger amount of phosphatic residue in the plots which received insoluble phosphates; but what these experiments prove is, that whatever be the theoretical explanation, the practical fact remains that both for immediate and for after fertility the soluble phosphates have produced better results than the ground phosphates.

Among the undissolved phosphates, phosphatic guano takes the lead both as regards immediate and permanent utility. The reason is obvious, and has nothing to do with any charm inherent in the name, but simply because it was in a finer state of division than any amount of grinding could attain. It had all been in solution at one time, and was afterwards precipitated. It may therefore be taken as an example of precipitated or reverted phosphate from whatever source obtained. It has done better than superphosphate or other dissolved phosphates, more especially in its abiding effect. The supply of phosphatic guano is now very limited, but the lesson taught by its use remains—viz., that insoluble phosphates are valuable as fertilisers, both for immediate and for remanent fertility, precisely in proportion to the fineness to which they are ground or otherwise reduced. The results of the dissolved phosphates are nearly all alike, and the main lesson taught by the results in the phosphate plots is that the more active the form of phosphate employed, the more immediate and also the more permanent is its manurial effect.

The plot whose results are most disappointing is the bone-meal plot, No. 5. There is a widespread, if not well-grounded, belief that bones or bone-meal is the best of all phosphatic manures for giving what may be called staying power to the land, and somehow it has earned a reputation for feeding the land, while most other artificial manures, if not regarded as exhausters, are at least looked upon with some suspicion as regards their permanent effects. Amongst the phosphate plots here the bone-meal plot is about the worst, so that it would seem that, whatever be the superiority of bone-meal over other manures, it certainly does not lie in the phosphatic part of it. So far as mere phosphates are concerned, finely-ground mineral phosphate is almost if not quite as good as fine bone-meal. If the alleged superiority of bone-meal over other artificials is not due to the phosphate it may be due to the nitrogenous constituent, or, perhaps, to the favourable combination of the two. The plots

of the nitrogen series—13 to 16—ought to throw some light on that matter. But here again we are disappointed to find that plot 5 is in nowise superior to any of these plots as regards its residual fertility. The nitrogen in dried blood and in horn-dust has a more tangible permanent effect than that in bone-meal; and although their immediate effect was less marked than that of bone-meal, in the years when they were applied, that may easily be ascribed to the fact that, along with the bone-meal, there was annually applied a little nitrate of soda, to bring the nitrogen of that plot up to the standard of the others on the station. It is then apparent that neither on account of its phosphatic nor on account of its nitrogenous matter has bone-meal any superiority over other phosphatic or nitrogenous manures; but, on the contrary, it occupies an inferior position in both respects. To what, then, does bone-meal owe its good reputation? I presume it owes it to the fact that, being both a phosphatic and a nitrogenous manure, it has succeeded in producing better crops than a purely phosphatic or a purely nitrogenous manure has done. Among the thousands of tests made by farmers to determine the relative merits of bone-meal and other manures, there are comparatively few in which that fact is kept in view. Despite the teaching of a quarter of a century, there are still plenty of farmers who are testing the relative merits of bone-meal and superphosphate without the least regard to the fact that the former is a nitrogenous manure and the latter is not, and it would be strange indeed if, in such cases, bone-meal did not acquire a superior reputation.

We must keep in mind, however, that the immediate effect of bone-meal and the other manures at Pumpherston station was tested on rotation cropping, and the after effects on hay crops. If the station had been pastured instead of cut for hay annually, it is probable that the bone-meal plot might have been in a better position. It is believed that sheep pasture upon grass that has been boned rather than on that which has been otherwise manured. The pasture is said to be sweeter, whatever that may mean. Certainly, if from any cause sheep prefer a boned part of a pasture to any other, that part will be eaten close, and fined down as regards the kind of grass grown upon it, and also manured by the sheep themselves to such an extent as to produce a permanently improved sward. I have seen instances of that kind, but in these instances the whole circumstances were somewhat complicated, and such as to give to bone-meal an adventitious value.

In the experiments at Pumpherston the question is stripped of all disturbing elements, and the bone-meal is judged in its efficacy from a purely manurial standpoint in comparison with other manures conveying to the land precisely the same amount

of manurial ingredients, and it has been found to occupy an inferior position.

Nitrogenous Manures.—In the next place, as regards nitrogenous manures, the four fully-manured plots—13, 14, 15, and 16—show that the plots which were formerly manured with the soluble salts, nitrate of soda, and sulphate of ammonia, and produced the largest crops, are now in a more exhausted condition than those to which horn-dust and dried blood were applied. The nitrate of soda plot maintains its superiority over the sulphate of ammonia one; and as we may be justified in assuming that all the nitrogen conveyed to the land in these two forms has long ago been utilised by the crops grown, or lost through drainage, we may fairly ascribe the greater fertility of the nitrate plot to the better condition of the soil, due to the larger amount of organic residues derived from the heavier crops produced on it. In the case of the other two plots, manured with the more slowly decomposing substances, horn-dust and dried blood, it is evident that there still remained in the soil some available organic residue derived from these substances six years after their application ceased; but it is also evident, from the results of last year's crop, that one of these (*viz.*, dried blood) has been exhausted, while the horn-dust still continues in the seventh year to slowly yield up some residue of its nitrogen.

Potash Manures.—In the next place, as regards potash manures, the residual effect of the muriate of potash is distinctly inferior to that of the sulphate, although during the years in which they were applied there was very little difference in the efficacy of these two kinds of manures. For an explanation of that inferiority we must look to the character of the grasses grown on these two plots. It is found that on the land formerly manured with sulphate of potash, and, as will be shown hereafter, on that which is at present being manured with sulphate of potash, cocksfoot is far more abundant than on the muriate plot; and indeed it would seem that where sulphate of potash is applied in quantity, cocksfoot grows particularly well.

Guanos.—As regards the guano plots, the information they convey is now of little practical interest, seeing that Peruvian guano, which has proved the most productive of the three, both in its immediate and in its residual effects, is now almost a thing of the past, and that Ichaboe guano is imported into the country in very limited quantity. Moreover, these expensive manures have not shown themselves in any way superior to the cheap mixtures applied to the other plots in quantities supplying the same amounts of manurial ingredients. Fish guano, which is still an important item in the manure market, has shown itself to be capable of benefiting crops very materially

during the second and third and even the fourth year after its application, but not thereafter.

Superphosphates.—As regards superphosphates, there is very little difference discernible between what is known as high class and low class superphosphates; and the evident conclusion to be drawn from these experiments is that the most economical superphosphate to use is the one that supplies soluble phosphate to the land at the cheapest rate.

GENERAL CONCLUSIONS REGARDING THE EXHAUSTION OF LIGHT MANURES.

Before drawing any conclusion on the subject of exhaustion from the results of the section of Pumpherston that has been cropped without manuring for seven years, we must, in the first place, arrive at some definition of exhaustion from an agricultural point of view. Strictly speaking, a manure is not exhausted so long as any of it remains in the soil and is capable of exerting an influence on the growth of a crop, however small; but that is not a definition of the term exhaustion that is of any value from an agricultural or practical point of view. It is evident from a glance at the results of last year's hay crop on the unmanured section that the traces of former manurings are not by any means obliterated, and it is probable that if the experiments were to be continued for other twenty years there would still be found some visible traces of former manurial treatment. But it is equally evident that the differences which are now discernible among the unmanured plots are so small as to be of no agricultural importance; and on looking back over the results of the last five years, during which the station has been under grass, it is seen that any substantial or appraisable increment of crop due to unexhausted manures ceased in the year 1890, when the produce of the unmanured section was on an average about one-third less than on the manured section. Since the time at which the manuring stopped four unmanured crops had been removed—viz., turnips, oats, and first and second year's grass. The turnip crop was a very small one—not more than half a crop; and that the failure of the crop was not due to an unpropitious season was shown by the relatively large crop grown on one part of the station which had been cropped for eight years without manures, but which received manure for the first time when the turnip crop was sown. The immediate cause of the failure of the crop was seen to be the want of nitrogenous manure, for on a few special plots which had nitrate of soda applied to them the crop was much above the average. Moreover, the deficiency was least felt on the

few plots to which insoluble nitrogenous manures were wont to be applied. Owing to the want of available nitrogenous manure, the unexhausted phosphates and potash salts were prevented from exerting their full influence. The succeeding barley crop (1887) averaged only two-thirds of a crop, and so did the first year's grass (1888). The second year's grass (1889) was less than two-thirds of the crop grown on that part of the station on which manuring was resumed. The third year's grass (1890) was also about two-thirds of that grown on the manured section; and as it seemed probable that the want of nitrogen in the case of a crop so dependent on nitrogen as grass was preventing the unexhausted phosphate and potash from coming into play, the unmanured section had a dose of nitrate of soda applied to it in 1891. The result of that treatment was to bring up the average of the crop to rather more than two-thirds of the fully manured section; but in the following year (1892), when nothing whatever was applied, the average crop of the unmanured section was not half that of the manured section. As an agricultural subject, the land on the unmanured section would be regarded as thoroughly exhausted. It would serve no good purpose to estimate too narrowly the rate of exhaustion of the various plots, or to endeavour to put numerical values on the rate per annum of exhaustion of the different manures. Figures of that kind are apt to be taken too absolutely by those who are not fully acquainted with the whole circumstances, and might be misleading.

The most that can safely be said on the subject from a study of these experiments is, that from a practical point of view, as bearing, for instance, on the question of compensation for the unexhausted remnant of applied manures on a thin clayey loam, ground phosphates are of tangible value four years after application; dissolved or precipitated phosphates five years; nitrate of soda and sulphate of ammonia two years; horn-dust and dried blood six years; sulphate of potash five years; and muriate of potash four years.

The relative rate of exhaustion of these manures during the years succeeding their application, or, in other words, the proportion of the originally applied quantity which is available for the use of a crop in each of the years succeeding its application, is a question which does not admit of an absolute answer, as it is dependent on a variety of conditions of soil, crop, and climate, and is not one that can be decided even for one set of circumstances unless by means of a number of different experiments.

MANURED SECTION, 1892.

The hay cut from all the plots has been separated out into the different species as in former years. The results are shown on Tables V., VI., and VII. The change in the composition of the herbage, which at first was so rapid and so striking, is now slowing down, and the grass is at length settling down to a condition which may be called permanent. The following table shows at a glance the general character of the changes in the grass crop over the whole station:—

ALTERATION OF MEADOW GRASS IN FIVE YEARS.

	1888.	1889.	1890.	1891.	1892.
Ryegrass	89	44	15	5.2	3.2
Cocksfoot . . . . .	...	12	25	47.6	43.9
Timothy	5	12	7	5.3	5.4
Dogstail	0.5	17	36	24.0	30.8
Foxtail . . . . .	...	0.2	...	0.3	0.8
Meadow grasses (poas)	3	7.5	2.5	1.1	4.7
Fescues	0.3	2.5	3	4.5	1.8
Yorkshire fog	2.2	4.8	11.5	12.0	9.4
	100.0	100.0	100.0	100.0	100.0

This table takes no account of the white clover which has been very slowly coming into the meadow, and which as yet amounts to only about 2 per cent of the total herbage.

The ryegrass, from constituting nine-tenths of the whole grass five years ago, is now little over 3 per cent. During last season the contest between cocksfoot and dogstail ended in favour of the latter, thus reversing the issue of the struggle of the former year. It seems likely that the results of next season will decide which of these grasses is to be the dominant one in future. The most notable advance last year was made by the meadow grasses, and the greatest retrogression by the Yorkshire fog. The severity of the last two seasons has probably favoured these changes, and it is evident that the occurrence of a growthy season would be of great service in finally deciding the nature of the change which grass must undergo at Pumpherstons on passing into permanent meadow.

As regards the special effects of different manures in modifying the character of the herbage, there is little to add to the information obtained in former years. The coldness of the season and the lateness of the manuring made the crop very

short, and prevented the manures from exerting their specific action in any marked degree, so that it is desirable to have the results of another season gathered in before finally reporting on that subject.

Plots 5 and 6 had to be utilised during the winter for driving dung to a neighbouring field, as the adjacent road was blocked for months with snow-drift. The consequence was that the results obtained last year from these two plots were considerably affected thereby, and prevented from being any longer comparable with those of the other plots of the section. These two plots have therefore been removed from the report, and they have now been ploughed up, and will be summer fallowed along with the four adjacent plots—1, 2, 3, and 4—so as to be ready for an experiment on different methods of laying down pasture.

[TABLES

TABLE I.—MANURES APPLIED IN APRIL 1892 (LB.), SECTION A.

No. of Plot.	Bone-meal.	Dissolved Bones.	Steamed Bone-flour.	Thomas-slag.	Mineral Phosphate.	Superphosphate.	Nitrate of Soda.	Sulphate of Ammonia.	Horn-dust.	Meat-meal	Castor-dust.	Peruvian Guano.	Fish Guano.	Ichaboe Guano.	Sulphate of Potash.	Muriate of Potash.
5	18	..	..	..	..	..	12	..	..	..	..	..	..	..	24	..
6	..	22	..	..	..	..	12	..	..	..	..	..	..	..	24	..
7	11	..	..	..	14	..	..	..	..	..	..	..	24	..
8	18	..	..	16	..	..	..	..	..	..	..	24	..
9	12	..	16	..	..	..	..	..	..	..	24	..
10	24	16	..	..	..	..	..	..	..	24	..
11	16	..	..	..	..	..	..	..	24	..
12	24	..	..	..	..	..	..	..	..	..	..
13	24	16	..	..	..	..	..	..	..	24	..
14	24	..	18	..	..	..	..	..	..	24	..
15	24	..	..	17	..	..	..	..	..	24	..
16	24	..	..	..	25	..	..	..	..	24	..
17	24	..	..	..	..	..	..	..	..	24	..
18	16	..	..	..	..	..	..	..	..	..
19	24	16	..	..	..	..	..	..	..	24	..
20	24	16	..	..	..	..	..	..	..	..	16
21	24	16	..	..	..	..	..	..	..	..	..
22	24	..
23	80	..	..	18	..
24	30	..	24	..
25	24	24	..
26
27
28	24	..	18	..	..	..	..	..	..	24	..
29
30	18	..	18	..	..	..	..	..	..	24	..
31 { ^a	24	12	..	..	..	..	..	..	..	24	..
32 { ^b	24	24	..	..	..	..	..	..	..	24	..
32 { ^c	24	36	..	..	..	..	..	..	..	24	..
33 { ^a	24	..	10	..	..	..	..	..	..	24	..
34 { ^b	24	..	20	..	..	..	..	..	..	24	..
34 { ^c	24	..	30	..	..	..	..	..	..	24	..
35 a	36	24	..	..	..	..	..	..	..	36	..
35 b	36	..	..	..	..	90	..	..	..	36	..
36 a	36	..	20	..	..	..	..	..	..	36	..
36 b	36	..	20	..	..	..	..	..	..	36	..
37 a	36	..	20	..	..	..	..	..	..	36	..
37 b	36	..	20	..	..	..	..	..	..	36	..

TABLE II.—HAY CROP, 1888, 1889, 1890, 1891.—*Unmanured Section B.*

No. of Plot.	Manures applied in 1878, 1879, 1881, 1882, 1883, 1884, AND 1885. (No manures applied in 1886, 1887, 1888, 1889, and 1890. Nitrate of Soda, 1 cwt. per acre applied in 1891.	Cwt. per acre.				
		1888.	1889.	1890.	1891.*	1892.
<i>Phosphatic Manures.</i>						
5	Bone-meal	27	24	24	18	...
6	Do. dissolved	28	27	27	24	...
7	Phosphatic guano	30	30	27	21	16
8	Do. do. dissolved	40	30	24	24	20
9	Ground mineral phosphates	21	27	27	27	13
10	Do. do. dissolved	31	27	30	24	13½
11	No phosphates	22	27	25	15	12
12	Bone-ash alone	14	21	12	24	16½
<i>Nitrogenous Manures.</i>						
13	Nitrate of soda	26	27	29	24	18
14	Sulphate of ammonia	28	27	24	24	12
15	Horn-dust (shoddy 1878)	30	33	30	24	22½
16	Dried blood	35	39	27	30	13½
17	No nitrogen	26	30	26	24	18
18	Nitrate of soda alone	16	24	20	24	22
<i>Potassic Manures.</i>						
19	Sulphate of potash	30	33	27	25½	19½
20	Muriate of potash	25	33	19	19½	15
21	No potash	16	27	25	22½	23
22	Potash salts alone	23	27	21	16½	12
<i>Guanos.</i>						
23	Peruvian	22	30	30	22½	18
24	Fish	35	33	18	19½	10
25	Ichaboe	21	24	25	19½	16½
27	Unmanured continuously	9	14	13	15	9
<i>Superphosphates.</i>						
28	10% Soluble phosphate	31	24	18	18	17½
29	25% do. do.	22	21	15	19½	...
30	40% do. do.	32	30	24	15	10½

* Nitrate of soda alone 1 cwt. per acre, 1891.

TABLE III.—SHOWING THE AVERAGE HAY CROP IN FIVE YEARS, 1888 TO 1892, UNMANURED; AND THE TOTAL DRY VEGETABLE MATTER PRODUCED IN EIGHT YEARS, 1878 TO 1886, MANURED.

No. of Plot.		Average Hay Crop, 1888-1892.	Total Dry Vegetable Matter, in two Rotations, 1878-1886.
	<i>Phosphatic Manures.</i>	Cwt. per acre.	Tons per acre.
5	Bone-meal	23	11.32
6	Do. dissolved	26	13.80
7	Phosphatic guano	25	12.47
8	Do. do. dissolved	27	14.11
9	Ground mineral phosphates	23	11.16
10	Do. do. dissolved	25	14.16
11	No phosphates	20	9.78
12	Bone-ash alone	17	6.50
	<i>Nitrogenous Manures.</i>		
13	Nitrate of soda	25	12.22
14	Sulphate of ammonia	23	11.62
15	Horn-dust (shoddy 1878)	28	9.28
16	Dried blood	29	10.38
17	No nitrogen	25	7.65
18	Nitrate of soda alone	21	8.63
	<i>Potassic Manures.</i>		
19	Sulphate of potash	27	11.57
20	Muriate of potash	22	11.06
21	No potash	19	8.98
22	Potash salts alone	20	5.35
	<i>Guanos.</i>		
23	Peruvian	24	10.23
24	Fish	23	8.41
25	Ichaboe	21	9.18
27	Unmanured continuously	12	5.45
	<i>Superphosphates.</i>		
28	10% Soluble phosphate	21	10.80
29	25% do. do.	...	...
30	40% do. do.	22	10.76

TABLE IV.—HAY CROP, 1892.—*Manured Section, A and C.*

No. of Plot.	MANURES APPLIED.	SECTION.		Average.
		A.	C.	
	<i>Phosphatic Manures.</i>	Cwt. per acre.	Cwt. per acre.	Cwt. per acre.
7	Steamed bone-flour	32	30	31
8	Thomas-slag	35	46	40½
9	Ground mineral phosphates	29	30	29½
10	Superphosphate	37	37	37
11	No phosphate	26	..	..
12	Superphosphate alone	32	..	.
	<i>Nitrogenous Manures.</i>			
13	Nitrate of soda	25	31	28
14	Sulphate of ammonia	31	31	31
15	Horn-dust	23	29	28½
16	Dried blood	37	36	36½
17	No nitrogen	22	..	..
18	Nitrate of soda alone	19	.	.
	<i>Potassic Manures.</i>			
19	Sulphate of potash	32	26	29
20	Muriate of potash	31	32	31½
21	No potash	22	..	.
22	Potash salts alone	15	..	.
	<i>Guanos.</i>			
23	Peruvian (with ammonia)	24	27	25½
24	Fish	28	21	25
25	Ichaboe	24	22	23
27	Unmanured continuously	9	.	.
	<i>Superphosphates.</i>			
28	27 % Soluble phosphate	24	..	24
30	36 % do do	26	..	26
29	Unmanured since 1889	11	..	11

TABLE V.—HAY CROP, 1892. NUMBER OF GRASSES OF EACH SPECIES (PER CENT).

No. of Plot.	MANURES APPLIED.	Ryegrass.	Cocksfoot.	Timothy.	Dogstail.	Foxtail.	Meadow Grasses.	Tall and Meadow Fescues.	Hard and Sheep's Fescues.	Yorkshire Fog.	Clover.	Sweet- scented Vernal.	Weeds.
5	Bone-meal	6.7	16.5	7.6	29.2	.9	7.4	5.5	.6	5.0	20.4	..	.2
6	Dissolved bones	2.6	19.8	8.9	33.8	.9	3.0	1.8	.7	12.4	16.2	..	..
7	Steamed bone-flour	6.6	18.1	1.6	33.6	..	2.0	1.2	8.1	13.2	10.6	..	..
8	Thomas-slag	10.1	15.2	2.6	29.8	..	3.0	1.4	7.9	13.3	7.4	..	4.3
9	Ground mineral phosphate	7.1	33.4	2.9	38.0	.2	2.8	.9	5.7	7.3	1.2	..	..
10	Superphosphate	10.1	41.3	1.3	16.3	..	4.1	3.8	8.1	10.3	3.6	..	1.1
11	No phosphate	8.9	17.9	3.0	34.1	.5	1.3	1.1	12.1	17.4	2.3	..	1.4
12	Superphosphate alone	8.0	8.5	1.7	56.0	..	2.1	1.9	3.2	12.5	1.8	3.6	.7
13	Nitrate of soda	6.3	13.9	2.3	45.3	.5	2.7	1.8	3.3	15.9	2.2	..	..
14	Sulphate of ammonia	7.7	24.3	2.5	37.6	1.5	1.4	1.3	2.8	15.9	5.0	..	..
15	Horn-dust	4.9	19.5	2.4	40.1	..	4.7	1.7	3.7	13.6	4.1	..	.3
16	Dried blood	6.4	19.5	1.8	30.0	..	5.1	1.5	1.3	13.9	13.5	..	..
17	No nitrogen	10.3	16.3	1.7	33.8	.7	4.1	1.5	3.3	19.7	5.3	..	2.3
18	Nitrate of soda alone	4.1	10.7	3.6	62.6	.9	1.2	4.1	5.6	7.2	..	..	..

*Phosphatic Manures.*With nitrogen and
potash.*Nitrogenous Manures.*With phosphate and
potash.

Potassic Manures.												
	Sulphate of potash	} With nitrogen and phosphates.	6.1	28.7	5.1	39.1	.9	4.9	2.9	4.9	7.4	..
19	Muriate of potash		7.4	19.3	6.9	42.5	1.1	3.8	4.2	3.8	8.4	2.6
20	No potash		9.1	17.8	8.9	47.8	...	2.4	3.6	6.3	8.7	1.4
21	Potash salts alone .		7.1	7.9	3.2	46.8	...	8.7	4.9	3.4	6.0	12.0
22												...
Guanos.												
23	Peruvian (with ammonia)	6.8	21.2	3.4	34.9	1.1	6.1	4.5	6.9	11.3	2.4
24	Fish	7.3	27.3	4.1	20.2	.6	7.1	7.0	3.5	14.2	7.8
25	Ichaboe5	25.1	6.3	32.4	...	4.1	3.8	2.1	18.5	7.2
Superphosphates.												
28	27 per cent superphosphates	} With nitrogen and potash.	7.9	27.7	4.7	40.2	.7	5.7	5.4	1.0	6.7	..
30	36 per cent do.		1.5	32.4	4.3	36.2	1.3	1.7	3.2	1.7	14.6	3.1
29	Unmanured since 1889 .		11.5	15.3	1.4	45.7	...	3.8	1.8	6.3	5.1	8.9
Complementary Manures.												
11c	Phosphate alone	4.9	22.3	1.5	45.4	...	5.9	3.1	4.4	9.9	2.6
12c	Nitrogen and potash (no phosphate)	4.3	21.2	1.0	30.4	...	1.2	2.3	5.0	32.4	2.2
17c	Nitrogen alone	15.8	24.9	1.5	32.3	...	3.8	2.7	7.5	11.4	...
18c	Phosphate and potash (no nitrogen)	11.4	21.0	2.8	30.1	...	6.8	.8	6.8	14.3	6.0
21c	Potash alone	6.7	17.3	1.6	34.2	...	4.1	1.0	12.4	8.3	14.4
22c	Phosphate and nitrogen (no potash)	6.8	19.0	3.4	43.5	1.0	4.1	3.8	8.2	9.7	..
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TABLE VI.—HAY CROP, 1892. BOTANICAL ANALYSIS. WEIGHT OF DIFFERENT SPECIES OF GRASSES (PER

No. of Plot	MANURES APPLIED.	Hyegrass.	Cocksfoot.	Timothy.	Dogtail.	Footail.	Meadow grasses.	Tall and Meadow Rescues.	Hard and Sheep's Rescues.	Yorkshire Fog.	Clover.
<i>Phosphate Manures.</i>											
5	Bone meal	3.0	37.6	13.9	25.0	1.9	2.8	8.8	.2	3.7	2.8
6	Dissolved bones	1.0	40.9	14.7	26.2	1.6	1.1	2.6	.3	8.4	3.1
7	Steamed bone-flour	3.1	42.2	3.1	29.5	...	.8	1.9	3.1	13.9	2.3
8	Thomas-slag	5.0	37.8	5.2	27.9	...	1.2	2.5	3.2	14.9	1.7
9	Ground mineral phosphate	2.5	59.0	4.2	25.4	.4	.8	1.2	1.7	4.6	.2
10	Superphosphate	3.4	69.5	1.7	10.3	...	1.1	4.6	2.3	5.7	.6
11	No phosphate	4.0	39.9	5.4	23.6	1.0	.5	1.5	4.4	12.8	.5
12	Superphosphate alone	3.5	20.9	3.5	52.3	...	.9	3.5	1.3	10.2	.4
<i>Nitrogenous Manures.</i>											
13	Nitrate of soda	2.7	39.8	4.0	36.3	.9	.9	2.7	1.3	11.2	.4
14	Sulphate of ammonia	3.0	47.8	4.1	27.8	2.8	.5	1.8	.9	10.3	.9
15	Horn-dust	2.1	42.0	8.3	32.5	..	1.7	2.6	1.3	13.2	.8
16	Dried blood	2.9	44.7	2.9	26.7	...	1.9	2.4	.5	15.0	2.9
17	No nitrogen	5.0	37.3	3.1	29.2	1.5	1.6	2.5	1.2	14.9	1.2
18	Nitrate of soda alone	1.8	23.7	6.4	52.0	1.8	.4	6.4	2.0	5.2	..

Potassic Manures.

19	Sulphate of potash	2.2	51.5	7.4	26.5	1.5	1.5	3.7	1.5	4.4	...
20	Muriate of potash	8.0	38.1	10.9	31.7	2.0	1.8	5.9	1.2	5.4	.5
21	No potash	3.9	37.8	6.7	37.8	...	1.5	3.9	2.2	6.1	.3
22	Potash salts alone	3.7	20.7	7.4	45.9	...	2.0	3.9	1.5	5.2	2.9
<i>Guanos.</i>											
23	Peruvian (with ammoniac)	3.2	42.7	5.4	26.4	2.0	2.0	6.4	2.3	7.7	.4
24	Fish	2.7	50.5	8.2	14.1	1.1	2.2	9.2	1.1	8.7	1.4
25	Ichaboe	1.9	46.5	9.4	26.6	...	1.3	5.0	.6	11.3	1.2
<i>Superphosphates.</i>											
28	27 per cent superphosphate	2.8	49.6	6.8	27.0	1.1	1.7	6.8	.8	3.9	...
30	36 per cent do.	.5	55.5	5.7	23.0	1.9	.5	3.8	.5	8.1	.5
29	Unmanured since 1889	5.5	36.9	2.8	41.4	...	1.5	3.0	2.5	4.0	2.0
<i>Complementary Manures.</i>											
11c	Phosphate alone	2.0	45.5	2.5	35.0	...	2.0	4.5	1.5	6.5	.5
12c	Nitrogen and potash (no phosphate)	1.7	44.4	1.7	23.9	...	.4	3.4	1.7	22.2	.4
17c	Nitrogen alone	6.8	54.0	2.7	26.4	...	1.4	4.1	2.7	8.1	...
18c	Phosphate and potash (no nitrogen)	5.1	47.4	5.1	25.6	...	2.6	1.3	2.6	9.0	1.3
21c	Potash alone	3.4	42.9	3.4	31.9	...	1.7	1.7	5.0	6.7	3.4
22c	Phosphate and nitrogen (no potash)	2.8	39.2	5.6	33.6	1.9	1.4	5.6	2.8	6.5	...

TABLE VII.—PUMPHERSTON GRASSES, 1892. WEIGHTS OF DIFFERENT SPECIES (GWT. PER ACRE).

No. of Plot.	MANURES APPLIED.	Ryegrass.	Cocksfoot.	Timothy.	Dogstail.	Footall.	Meadow Grasses.	Tall and Meadow Rescues.	Hard and Sheep Rescues.	Yorkshire Fog.	Clover.	Sweet-scented Vernal.	Weeds.
5	Bone-meal	.6	7.9	2.9	5.3	.4	.6	1.8	.1	.8	.6	..	.1
6	Dissolved bones	.8	12.8	4.4	7.9	.6	.3	.8	.1	2.5	.9	..	..
7	Steamed bone-flour	1.0	13.5	1.0	9.2	..	.3	.7	1.0	4.5	.8	..	..
8	Thomas-slag	1.8	13.2	1.8	9.8	..	.4	.9	1.1	5.2	.6	..	.2
9	Ground mineral phosphate	.7	17.1	1.2	7.4	.1	.2	.4	.5	1.3	.1	..	..
10	Superphosphate	1.3	26.1	.6	8.9	..	.4	1.7	.8	2.2	.2	..	.3
11	No phosphate	1.0	10.4	1.6	7.4	.2	.1	.4	1.1	3.3	.1	..	.4
12	Superphosphate alone	1.1	6.7	1.1	16.8	..	.3	1.1	.4	3.3	.1	.8	.3
13	Nitrate of soda	.7	10.2	1.0	9.3	.2	.2	.7	.3	2.8	.1	..	..
14	Sulphate of ammonia	.9	15.1	1.3	8.8	.9	.1	.6	.3	3.2	.3	..	..
15	Horn-dust	.6	11.8	.9	9.1	..	.5	.7	.4	3.7	.2	..	.1
16	Dried blood	1.1	16.8	1.1	10.0	..	.7	.9	.2	5.6	1.1	..	..
17	No nitrogen	1.1	8.4	.7	6.6	.3	.3	.6	.3	3.3	.3	..	.6
18	Nitrate of soda alone	.4	4.6	1.2	10.2	.4	.1	1.2	.4	1.0	..	..	..

<i>Potassic Manures.</i>											
19	Sulphate of potash	} With nitrogen and phosphate.	.7	16.3	2.3	8.4	.4	.4	1.7	.4	1.4
20	Muriate of potash		.9	11.8	3.4	9.8	.6	.4	1.8	.4	1.7
21	No potash		.9	8.5	1.5	8.5	...	.2	.9	.5	1.8
22	Potash salts alone		.6	3.1	1.1	6.9	.	.6	1.3	.2	.8
<i>Guanos.</i>											
23	Peruvian (with ammonia)	.	.8	10.3	1.3	6.3	.5	.5	1.5	.5	1.9
24	Fish	.	.8	14.1	2.3	4.0	.3	.6	2.6	.3	2.4
25	Ichaboe	.	.5	11.2	2.3	5.4	..	.3	1.2	.1	2.7
<i>Superphosphates.</i>											
28	27 per cent superphosphates	} With nitrogen and potash.	.7	11.9	1.6	6.5	.3	.4	1.6	.1	.9
30	36 per cent do.		.1	14.5	1.5	6.0	.5	.1	1.0	.1	2.1
29	Unmanured since 1889		.6	3.3	.3	4.3	..	.2	.3	.3	.4
<i>Complementary Manures.</i>											
11c	Phosphate alone	.	.4	8.6	.5	6.7	..	.4	.8	.3	1.2
12c	Nitrogen and potash (no phosphate)	.	.3	6.6	.3	3.5	..	.1	.5	.3	3.3
17c	Nitrogen alone	.	1.0	8.8	.3	4.2	..	.2	.5	.3	1.2
18c	Phosphate and potash (no nitrogen)	.	1.6	15.0	1.6	8.1	..	.8	.4	.8	2.8
21c	Potash alone	.	.8	9.9	.8	7.3	..	.4	.4	1.1	1.5
22c	Phosphate and nitrogen (no potash)	.	.5	7.1	1.0	6.1	.3	.2	1.0	.5	1.2

THE ECONOMICAL MANURING OF THE TURNIP CROP.

BEING THE RESULT OF FIELD EXPERIMENTS THROUGHOUT
SCOTLAND IN 1892.

By Dr A. P. AITKEN.

EXPERIMENT VIII. C.

This experiment is a development of one which has for four years been tried by many agricultural associations in different parts of Scotland. Its object, as described on the Schedules supplied to the experimenters, is threefold.

1. To compare the effect of bone-meal, superphosphate, and Thomas-slag as phosphatic manures for the turnip crop, along with a definite amount of nitrate of soda.
2. To discover what proportion the nitrate of soda should bear to the phosphate.
3. To compare the effect of nitrate of soda with that of an equivalent amount of sulphate of ammonia.

These phosphates and nitrogenous manures were chosen because former experiments had shown that they were the cheapest and best materials wherewith to grow a crop of turnips.

The Society supplied as usual all the manures free of cost, and done up in bags carefully labelled and described, so that no error might occur in applying them each to its own plot. There were in all nine plots, each one-fortieth of an acre in area; and the quantities of manure per plot and per acre, and their cost per acre, are shown on the accompanying table.

Plot.	Quantities of Manure.	Per plot.			Per acre.		Cost per acre.	
		lb.	oz.	cwt.	s.	d.	s.	d.
1.	Fine bone-meal . . .	11	3	4	}		=26	0
	Nitrate of soda . . .	0	11	$\frac{1}{4}$				
2.	Superphosphate . . .	16	12	6	}		=26	0
	Nitrate of soda . . .	2	13	1				
3.	Thomas-slag . . .	25	0	9	}		=26	0
	Nitrate of soda . . .	2	13	1				
4.	Mixed super and slag . . .	21	0	$7\frac{1}{2}$	}		=26	0
	Nitrate of soda . . .	2	13	1				
5.	Mixed super and slag . . .	21	0	$7\frac{1}{2}$	}		=35	0
	Nitrate of soda . . .	5	10	2				
6.	Fine bone-meal . . .	11	3	4	}		=26	0
	Sulphate of ammonia . . .	0	9	$\frac{1}{5}$				
7.	Superphosphate . . .	16	12	6	}		=26	0
	Sulphate of ammonia . . .	2	4	$\frac{4}{5}$				
8.	Mixed super and slag . . .	21	0	$7\frac{1}{2}$			=17	0
9.	Nothing . . .	...	...	...			...

The manures are supplied in quantities required to bring them all to the same cost of 26s. per acre—a moderate cost for a turnip manure—except in the case of plot 5, which got a double dose of nitrate, and plot 8, which got none. The quantity of nitrate of soda and also of sulphate of ammonia given along with bone-meal is only one-fourth of that applied to the other plots, because bone-meal is itself a nitrogenous manure as well as a phosphatic one, and the amounts of nitrate and sulphate added to it on plots 1 and 6 are such as to make it on a par with plots 2 and 7, &c., as regards nitrogen.

A detailed account of the result obtained at the different districts, and on the different farms, are given on Tables I. to IX. at the end of this paper, for the special benefit of those farming in these districts, but for the general reader a summary of the whole may be given here (see p. 288).

On this table are shown the results at eight districts, at each of which six or more experiments were successfully carried out—three districts in Aberdeenshire, and one each in the other counties of Ross and Cromarty, Kincardine, East Lothian, Berwick, and Dumfries. There are also two results from Perthshire. Altogether about sixty farmers have succeeded in performing this experiment in such a way as to give results worthy of recording for the solution of the questions proposed. There are, unfortunately, many others whose results are unreliable from a variety of causes—viz., attack of fly, finger-and-toe, rotting after frost, and accidents and inequalities of various kinds. Some of these failures, though they are of no use for the main purpose of the experiment, are most interesting from other points of view, and instructive to members of the associations who have seen them and discussed them, but they cannot be noticed here.

Taking the general results of the sixty-one experiments shown on table (p. 288), irrespective of local qualifying circumstances, we see that there is very little difference in effect between superphosphate and Thomas-slag when applied at the rate of 6 cwt. and 9 cwt. per acre respectively; that is to say, in quantities of equal money value: and a mixture of the two in equal parts is just as good as either separately. Bone-meal has shown itself to be distinctly inferior to the other two by 1 or 2 tons per acre, but that is a very considerable deficiency in a crop averaging $17\frac{1}{2}$ tons per acre. It is quite evident, however, that this deficiency must not be attributed entirely to the kind of phosphate. The results show quite clearly that it was to some extent the want of nitrogen in a rapidly available form that caused the deficiency in the bone-meal plots. The character of the season is a very important factor in this case. The general character of 1892 was cold and dull in early summer, cool and

EXPERIMENT VIII. C—AVERAGE RESULT OBTAINED IN EIGHT DISTRICTS THROUGHOUT SCOTLAND.

No. of plot	Manures	No of ex- periments	1		2		3		4		5		6		7		8		9	
			Bone meal ‡ nitrate		Super Nitrate		Slag Nitrate		Super and slag Nitrate		Super and slag Double nitrate		Bone-meal ‡ sulphate of ammonia		Super Sulphate of ammonia		Super and slag		Nothing	
			tons cwt		tons cwt		tons cwt		tons cwt		tons cwt		tons cwt.		tons cwt.		tons cwt.		tons cwt.	
1. Turriff, Aberdeenshire .		11	15 2		15 13		16 13		16 14		16 16		14 12		14 17		14 1		7 0	
2. Aberdeen, " .		7	17 5		17 15		19 9		19 5		18 5		16 12		18 14		18 14		12 16	
3. Strathbogie and Inverurie		7	15 18		18 1		18 7		18 9		18 7		16 16		17 1		16 10		9 3	
4. Ross and Cromarty .		7	16 1		18 2		17 11		18 13		18 16		16 5		17 18		17 3		14 6	
5. Humber, East Lothian .		6	14 10		18 6		17 17		17 3		18 7		16 6		18 4		16 19		13 7	
6. Lauderdale, Berwickshire		8	11 9		14 1		14 0		13 16		15 15		12 3		13 14		11 19		9 0	
7. Mid Annandale, Dum- friesshire		8	15 11		17 12		16 4		17 14		18 19		17 4		16 1		16 0		12 6	
8. Kinross, Perthshire .		7	17 4		17 14		18 13		18 2		16 13		17 14		17 14		17 0			
Average of 61 experiments			15 7		17 3		17 7		17 9		17 15		15 19		16 15		16 1		11 3	

dull thereafter, and dull and wet in autumn—not a good season on the whole, although here and there the crop grew very well. In most cases the circumstances were such as to favour those plots that had a fair dose of nitrate to give the crop a good start; and the want of a growthy October and November prevented those plots to which phosphatic and nitrogenous manures of a less active kind were applied from making up upon their rivals to the extent that they would have done had the weather been more favourable. The want of sunshine, and the general coldness during the first half of the season, is mainly responsible for the general smallness of the crop and the inefficiency of the nitrogenous manures. Sulphate of ammonia in the small quantity applied along with bone-meal has done more for the crop than its equivalent of nitrate of soda. The dry cold weather in June was not favourable to the action of nitrate, and by the time that the warmer weather arrived there was probably very little of it left in the soil. When applied in larger quantity, along with superphosphate, it was more effective than the corresponding quantity of sulphate of ammonia, especially on the lighter class of soils. Where the soils were richer in organic matter, however, the sulphate of ammonia did rather better than the nitrate of soda; and this may be accounted for on the assumption that in the heavier soils containing more organic matter the nitrifying organism would be more abundant, and the conditions, especially as regards warmth, would be more favourable to its activity. It is a matter of common experience that sulphate of ammonia affects the growth of crops more slowly than nitrate of soda, and the reason of that seems to be that it has to be converted into nitrate by means of the nitrifying organism before it becomes available as a manure.

The relative merits of nitrate of soda and sulphate of ammonia is a subject that is constantly being discussed, and deservedly so, for they are both very powerful and also very expensive manures. The fact that nitrate of soda is much more liable than sulphate of ammonia to be washed down through the soil and carried away by the drains during wet weather is well understood nowadays. This fact was very forcibly brought home to those who tried a similar experiment last year, but in 1891 the weather conditions were entirely different. Heavy floods, which occurred just after sowing, washed away the most of the nitrate applied to the lighter class of soils. The inference which one naturally draws is that nitrate of soda is less profitably applied on light soils than on those that are heavier and more retentive. The results of last year's experiments, however, show that there is another side to the question. They show that, despite what may be called the greater solubility of nitrate of soda, it has suited the lighter

soils better than the heavier ones, and that the question is not one to be decided upon the ground of solubility alone. The other side of the question will be apparent if we keep before our minds the fact that sulphate of ammonia has to be converted into nitrate before the plant can make use of it, and that this conversion has to be performed by a living organism, which is less abundant in light, sandy, and gravelly soils than in the heavier soils, and in those richer in organic matter. It is therefore expedient that a portion of the nitrogenous manure applied to light soils should be in the form of ready-made nitrate, and of course this is especially advantageous in dry districts and during dry seasons, and also in cold seasons when the nitrifying organism is less active. Fortunately nitrate of soda is a manure that can be applied at any time when the conditions are considered favourable and the farmer has it in his power to avoid undue loss from its application.

One very striking fact brought out by these experiments is that the application of nitrogenous manures to the turnip crops last year had very little effect upon the growth. Nitrate of soda, at the rate of 1 cwt. per acre, increased the crop by only about $1\frac{1}{2}$ tons per acre; and even when double that quantity was applied the average increase was under 2 tons. The smaller quantity barely repaid its cost, but the second cwt. was a dead loss. It produced an increase of only about 6 cwt. turnips per acre, and in all probability that increase was mainly due to water, and may have added almost nothing to the amount of actual fodder grown. During the month of August the effect of the heavier application was very visible in the amount of tops on plot 5, and gave promise of an abundant return for the increased outlay, but as the season advanced the growth ceased and the other plots gradually overtook it.

The phosphates—mixed superphosphate and slag—applied alone at a cost of 17s. per acre. produced an average increase of nearly 5 tons per acre over the plot which got no manure; but there were great differences on the different farms in this respect. On some of the better kinds of land, even, the phosphates did not pay; while on the light and poor soils the want of phosphates resulted in absolute failure. Most of the experimenters selected their poorest fields for the experiments, and that very properly, for it was their desire to know how most economically to grow a fair crop on those parts of the farm where turnip-growing was least successful.

On some of the farms the manures were applied with and without dung, and it was found in most cases that the addition of the dung made only a slight increase in the crop; and on some farms where a comparison was made between the effect

of the artificial and that of dung alone, the artificials had the best of it.

Keeping in view that the season was dull and cold, and that the autumn was wet, and that frost came early and was severe during the winter, and that no dung was applied to the turnip crop, the main results of these experiments may be shortly summed up as follows:—

1. Bone-meal has not been so good a manure as slag and superphosphate, to which an equivalent quantity of nitrate of soda or sulphate of ammonia is added.

2. For bone-meal, and also, though to a less extent, for slag, mild growing weather in autumn is required in order to produce a fair return for the expense of the manures.

3. A mixture of slag and superphosphate is a good safe phosphatic manure for promoting the growth of turnips, both in the early and later part of the season.

4. More than 1 cwt. of nitrate of soda per acre does not pay.

5. The result of applying 2 cwt. per acre of nitrate of soda is to produce an undue growth of tops, and to render the crop more liable to disease during winter frosts.

6. Nitrate of soda, though more liable than sulphate of ammonia to be washed down through the soil during a wet summer, when applied to light thin soils containing little organic matter, is more advantageous than sulphate of ammonia on such soils during a cold dry summer; and therefore it is expedient to apply to even the lightest soils a certain amount of nitrate of soda in a turnip manure.

7. Sulphate of ammonia is more active upon heavy than on light land, and exerts its influence chiefly in the latter part of the growing season.

8. The risk of damage to the turnip crop from recurring frosts during winter is so great that in the average of seasons it will be found more economical to store turnips at the end of November.

9. Turnips that are pulled in the latter part of November and left in rows on the field with the bulbs covered with earth and only the tops exposed, do not suffer even during a severe winter, but may even increase in weight to some extent.

10. Dugging in the drills is a very expensive method of manuring turnips, and experiments are wanted to see if the ploughing-in of dung on the turnip-break in the late autumn or early winter would not produce a safer and better crop.

TURRIFF AGRICULTURAL ASSOCIATION.

Experimenters.

Mr PETER ANDERSON, Backhills, Turriff.
 Mr JOSEPH BROWN, Dorlaithers, Turriff.
 Mr JAMES COWIE, Haremos, Turriff.
 Mr ADAM DAVIDSON, Boghead, Dunlugas, Turriff.
 Mr DAVID DAVIDSON, Cabra, Mintlaw.
 Mr ALEXANDER JACK, Backmill, Turriff.
 Mr J. KNOX LEDINGHAM, Plaidy Farm, Turriff.
 Mr JOHN MILNE, Mains of Laithers, Turriff.
 Mr ALEXANDER SLESSOR, Raecloch, Turriff.
 Mr WILLIAM SLESSOR, Shielburn, Inverkeithny.
 Mr WILLIAM THOMSON, Burnside of Idoch, Turriff.
 Mr R. CRUICKSHANK, Claymires, *Secretary*.

(See Table I., p. 298.)

In this district, situated on the clay-slate formation, the most notable feature is the pretty general deficiency noticed on plots 6 and 7, which received their nitrogenous manure in the form of sulphate of ammonia. Most of the fields chosen for the experiment were on light poor land, where the conversion of sulphate of ammonia into nitrates would proceed but slowly. An exception is that of Raecloch, where the soil was a heavy clay loam. But as only one-fifth part of each plot, a $\frac{1}{250}$ th part of an acre, was weighed, the result must be received with caution. At Haremos and Blackmill "finger-and-toe" appeared to such an extent as to disqualify some of the plots, and on some others the severe frosty weather damaged the bulbs a good deal; but it was noticed by some of the experimenters that plot 8, which got no nitrogenous manure, suffered less in that respect than the others.

ABERDOUR AGRICULTURAL ASSOCIATION.

Experimenters.

Mr HUGH FRASER, New Aberdour, Fraserburgh.
 Mr HUGH GORDON, Bridgend, Tyrie, Fraserburgh.
 Mr ALEXANDER LOVIE, Nether Boyndlie, Fraserburgh.
 Mr ALEXANDER S. MORRISON, Stonebrigg, Fraserburgh.
 Mr DAVID WILSON, Burnthill, Fraserburgh.
 Mr WILLIAM WATSON, Middlemuir, Strichen.
 Mr WILLIAM CHAPMAN, Woodhead, Aberdour, *Secretary*.

(See Table II., p. 299.)

In this district there is a considerable variety of soils, and the results obtained are somewhat irregular. Owing to the severe winter the number of rotten turnips was very large; and it would seem that on the black-top soils the damage due to that cause was greatest. These soils do not respond well to the application of nitrogenous manures. It is evident

that their chief deficiency is not in nitrogen. This view is fully confirmed by the results obtained on plot 5, which got a double dose of nitrate. It rather injured than benefited the crop, causing a rapid growth of shaw and a weakly condition of bulb, which was less able than the others to endure the alternations of frost and thaw. The phosphates have told well, except in the case of bone-meal, which is partly a nitrogenous manure, and which rots but slowly in a black soil. It is evident that slag is the kind of phosphate most suitable to the district, and this is probably due to its containing a considerable quantity of lime. I would infer from the result in this district that lime is what is most deficient in the soils, and would suggest to the farmers of the district the expediency of making some experiments to test the utility of both lime and potash as a manurial preparation for turnips.

An interesting and instructive experiment was tried by Mr Lovie, Nether Boyndlie. He lifted one-half of his turnips in December, and after weighing them he covered them up on the field with a slight covering of earth. The other half he allowed to lie till February in order to see whether they would keep as well as the others. He found that the protected turnips lost nothing, but in some cases they actually gained a little, while those that were left exposed in the drills lost weight to the extent of about $2\frac{1}{2}$ tons per acre—that is to say, about one-tenth of the whole crop. The plots manured with bone-meal and with phosphates alone suffered least.

During a mild open winter the loss from exposure would doubtless be less, but in our uncertain climate I am of opinion that it is safer to store turnips in November than to allow them to lie longer with the hope that they may gain a little in weight during December, however mild the weather may be. The increase of bulb which is sometimes noticed during the short days of winter is more apparent than real. As the shaws fall down the bulbs are better seen, and their greater prominence is apt to be mistaken for increased growth.

STRATHBOGIE, INSCH, AND INVERURIE DISTRICTS.

Experimenters.

Mr JOHN DUNCAN, Downin, Huntly.
 Mr JAMES MERSON, Craigwillie, Huntly.
 Mr WILLIAM SCOTT, Corsiestone, Huntly.
 Mr JAMES WILSON, Arnhall, Huntly.
 Mr ANDREW CRUICKSHANK, Huntly, *Secretary*.

Mr PETER BRUCE, Myreton, Inch.
 Mr G. A. BRUCE, Inchfield, Inch.
 Mr WILLIAM DURN, Aulton, Inch.
 Mr JAMES KENNEDY, Greenhall, Inch.
 Mr WILLIAM HOME, Inch, *Secretary*.

Mr GEORGE BRUCE, Heatherwick, Inverurie.
 Mr JAMES DURNO, Eastertown, Old Meldrum.
 Mr LESLIE DURNO, Mains of Glack.
 Mr GEORGE FERGUSON, Lumphart, Inverurie.
 Mr JAMES FOWLER, Nether Blackhall, Inverurie.
 Mr JAMES STEPHEN, Conglass, Inverurie.
 Mr JAMES STEPHEN, Inverurie, *Secretary*.

(See Table III., p. 300.)

The inclement autumn and winter dealt rather severely with the experiments. The tops on almost all the farms were decayed before the crops were lifted, and the number of bulbs that rotted was also very considerable. Not one-half of the experiments were considered reliable. On the farm of Dowmin a most carefully conducted test was spoiled on account of an unexpected inequality of the soil on the part of the field where it was laid down. The seven that were considered satisfactory exhibit results which harmonise very closely with the average results over the country.

ROSS AND CROMARTY AGRICULTURAL EXPERIMENT CLUB.

Experimenters.

Mr WALTER ARRAS, Fodderty, Dingwall.
 Mr JOHN GORDON, Cullisse, Nigg.
 Sir ARTHUR G. R. MACKENZIE of Coul, Bart.
 Mr GEORGE MIDDLETON, Corntown, Cononbridge.
 Mr DONALD ROSS, Lower Tarrel, Fearn.
 Mr GEORGE G. CLARK, Middat.
 Mr JOHN ROSS, Meikle Tarrel, Fearn, *Secretary*.

(See Table IV., p. 301.)

The experiments here, as in the Mid-Aberdeenshire district, were much injured by inclement weather. The season was unusually cold and wet, and the winter's frost unusually early and severe. Only about half the number of those who tried the experiments have been able to send in results. In addition to the climatic disturbance, disease in the form of "finger-and-toe" did much damage on some farms. Where the experiments succeeded, the results corroborate those obtained elsewhere.

HUMBIE EXPERIMENT CLUB.

Experimenters.

The MASTER of POLWARTH, Humble House, Upper Keith.
 Mr GEORGE GIBSON, Peaston Bank.
 Mr WALTER H. GIBSON, Camptown, Haddington.
 Mr THOMAS A. GREENSHIELDS, Windy Mains, Pencaitland.
 Mr JOHN J. SHARP, Ewington, Haddington.
 Mr WILLIAM TOD, Stobshiel, Upper Keith.
 Mr GEORGE HENDERSON, Upper Keith, *Secretary*.

(See Table V., p. 302.)

The feature of the experiments in this district which chiefly attracted the attention of the members was the comparative failure of the two plots manured with bone-meal. This has already been noticed in summary given on page 287. It was noticed, however, that these two plots made great progress in the latter part of the season, and so also did plot 3, manured with slag. The crops were lifted early, so that they suffered less than in other districts; but considering the slow growth in the early part of the season, it is very probable that three weeks' longer growth would have told favourably on plots 1, 6, and 7.

LAUDERDALE AGRICULTURAL SOCIETY.

Experimenters.

Mr ROBERT SHIRRA GIBB, Boon, Lauder.
 Mr ROBERT DICKINSON, Newbigging, Lauder.
 Mr GEORGE RUNCIMAN, Wanton Walls.
 Mr JOHN W. WADDELL, Lauder Barns.
 Mr JOHN MACKAY, Estate Office, Lauder.
 Mr G. L. BROOMFIELD, Lauder, *Secretary*.

(See Table VI., p. 303.)

The results in Lauderdale last season quite confirm the general experience, except in one particular—viz., the somewhat more favourable return got from the application of the double dose of nitrate; but it will be seen that two experiments—those at Lauder Barns and West Mains—are chiefly responsible for the increase.

MID-ANNANDALE AGRICULTURAL SOCIETY.

Experimenters.

Mr JOHN AITCHESON, Ferneycleugh, Lochmaben.
 Mr DAVID BRAND, Hangingshaw, Lockerbie.
 Mr JAMES S. CARRUTHERS, Broomhills, Lockerbie.
 Mr F. J. C. CARRUTHERS of Dixons, Lockerbie.
 Sir R. JARDINE, Bart., Castlemilk Home Farm, Lockerbie.
 Mr GEORGE W. KIRK, Poolhouses, Lockerbie.
 Mr WILLIAM M'CRONE, Castlemilktown, Lockerbie.
 Mr ALLAN MURRAY, Castlemilk Mill, Lockerbie.
 Mr JOHN ALEX. MACKENZIE, Lockerbie, *Secretary*.

(See Table VII., p. 304.)

Although the average results of the experiments in this district agree in the main with those got elsewhere, it is evident that some of them are rather anomalous and require to be repeated. The work was done with great care, but on a wrong principle. Each plot consisted of two drills 80½ yards long. The application of manures to plots so narrow is liable to much irregularity even during perfectly calm weather, and

quite unreliable if any wind is blowing. To add to the risk of error the plots were not weighed as a whole, but a small cross-section was chosen, and as the total weight of turnips lifted from the section was less than 90 lb. for each plot, any irregularity which occurred would be greatly exaggerated when multiplied into the produce of an acre.

On some of the farms a similar portion of the field where dung had been applied along with artificials was weighed, but the produce in most cases was very little better than the experimental plots.

KINCARDINESHIRE FARMERS' ASSOCIATION.

Experimenters.

Mr JOHN BENNET, Myreside, Raemoir, Banchory.
 Mr JAMES DON, Auquhirie, Dunnottar.
 Mr WILLIAM DUNBAR, Newton, Raemoir.
 Mr JOHN FARQUHARSON, Mains of Caterline, Stonehaven.
 The Rev. WILLIAM DISNEY INNES of Cowie, Lumgair.
 Mrs INNES of Raemoir, Banchory.
 Mr JAMES MILNE, Cairnhill, Muchalls.
 Mr WILLIAM NICOL, Easter Muchalls.
 Mr JOHN PRATT, The Green, Raemoir, Banchory.
 Mr JOHN TAYLOR, Uras, Stonehaven.
 Mr JOHN HART, Mains of Cowie, *Secretary*.

(See Table VIII., p. 305.)

In this district the crop was not lifted till far on in the winter, and much damage was done, so that the majority of the experiments were considered unreliable. Those that are recorded are mostly from farms where the natural strength of the soil enabled the crop to withstand the rigours of winter, but it is evident that the weight of the crops has not been much affected by the manures applied. The reports from several farms were sent in too late for publication, but the results contained in them confirm in the main those shown on Table VIII.

STRATHEARN FARMERS' ASSOCIATION.

Experimenters.

Mr W. S. FERGUSON, Bargarvie, Perth.
 Mr JAMES PATERSON, Burnbank, Blairdrummond.
 Mr MACDUFF DUNCAN, Damside, Auchterarder.
 Mr J. E. SMITH, Eastfield, Bridge of Earn, *Secretary*.

(See Table IX., p. 306.)

The two successful experiments performed by members of this association came from districts very wide apart and must be considered individually.

At Balgarvie the field where the test was made was in high condition, and the part chosen for the purpose was all that could be desired. The result shows that nitrogenous manures were little needed, and that the kind of phosphate was the important thing. Bone-meal did better here than in most other districts, but slag was not a success.

At Burnbank also the experiment was well laid down, and on the light soil there with nitrogen and phosphates had a marked effect. Nitrate of soda, as has already been noticed in the general report, did more for the crop than sulphate of ammonia; and slag gave a poorer result than usual. Both of these peculiarities may be explained to some extent by the fact that the season was a very late one and the crop was lifted very early. Had plots 1, 3, and 6 had another month's growth in them, they would have much improved their position.

I inspected all the crops in the district in October, and regret that the others, though very carefully put down and promising well when I saw them, were too much interfered with by bad weather to give reliable information.

[TABLES

TABLE I.—EXPERIMENT VIII. C. TURRIFF AGRICULTURAL ASSOCIATION.

No. of plot.	Manures	{	1	2	3	4	5	6	7	8	9
			Bone-meal ½ nitrate	Super Nitrate	Slag Nitrate	Super and slag Nitrate	Super and slag Double nitrate	Bone-meal ½ sulphate of ammonia	Super Sulphate of ammonia	Super and slag ...	Nothing
			tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1.	Backhills	.	13 7	13 15	14 12	16 12	14 12	13 0	11 19	15 10	...
2.	Dorlathers	.	12 18	14 14½	14 13½	16 4½	15 3	11 8	12 13	10 4½	2 0
3.	Hareness	.	9 11	10 0	10 3	10 7	...	...	12 11	11 5	5 12
4.	Boghead, Dumlugas	.	17 13	16 0	17 7	15 4	18 13	14 3	13 9	14 13	1 9
5.	Backmill	.	16 15	17 10	18 15	19 5	14 0	18 5	...	...	...
6.	Plaids Farm.	.	14 11½	16 6	16 3	15 16	16 3½	13 6½	12 5	11 7½	7 11½
7.	Mains of Leithers	.	19 0	18 17	17 18	19 3	21 7	15 9	18 0	16 6	13 4
8.	Shielburn	.	13 0	15 2	15 4	16 2	12 8	10 13	13 14	15 5	7 17
9.	Raeeloch	.	16 8	17 6	20 3	18 7	16 1	19 5	18 18	18 7	...
10.	Burnside of Idoch	.	15 1	21 8	20 7	19 5	20 3	13 9	16 12	10 9	9 0
11.	Cabra, Mintlaw	.	17 19	18 17	17 18	19 13	20 2	17 11	18 16	17 5	12 0
Average.			15 2	15 13	16 13	16 14	16 16	14 12	14 17	14 1	7 0

NOTES.

- Soil*, light loam. *Crop*, golden yellow; sown June 7, lifted Jan. 27.
- Soil*, poor black. *Crop*, injured experimental crop more than dunged crop.
- Soil*, moorish on iron pan. *Crop*, bullock yellow; sown June 4, lifted Jan. 27.
- Soil*, good sandy loam on sandy clay. *Crop*, Sitlyton purple-top yellow; sown June 10, lifted Dec. 19.
- Soil*, deep sandy loam on gravel. *Crop*, Aberdeen bullock yellow; sown May 31, lifted Dec. 22. Plots 7 and 9 had finger-and-toe.
- Soil*, light shallow on hard pan. *Crop*, green-top yellow; sown June 8, lifted Dec. 17. No blanks; fair even crop. Plots 1, 6, 6, and 9
- came last to hoe. *Crop*, Aberdeen bullock yellow; sown June 9, lifted Dec. 23.
- Soil*, poor thin clay slate. *Crop*, Aberdeen yellow; sown June 6, lifted Dec. 24.
- Soil*, heavy clay loam. *Crop*, bullock yellow; sown June 15, lifted Jan. 26.
- Soil*, yellow loam. *Crop*, Aberdeen bullock green-top yellow; sown June 9, lifted Dec. 20. No. 2 first singled; Nos. 1 and 6 had smallest plants at singling.
- Soil*, light gravelly loam. *Crop*, yellows; sown June 11, lifted Jan. 19.

TABLE II.—EXPERIMENT VIII. C. ABERDOUR AGRICULTURAL ASSOCIATION.

No. of plot.	Manures	1	2	3	4	5	6	7	8	9
		Bone-meal $\frac{1}{2}$ nitrate	Super Nitrate	Slag Nitrate	Super and slag Nitrate	Super and slag Double nitrate	Bone-meal $\frac{1}{2}$ sulphate of ammonia	Super Sulphate of ammonia	Super and slag ...	Nothing
		tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Woodhead	.	11 12	11 12	12 6 $\frac{1}{2}$	13 8	15 0	15 0	15 11	12 17	7 10
2. New Aberdour	.	17 14	19 6	18 4	16 1	19 16	16 12	17 14	22 10	13 19
3. Bridgend, Tyrie	.	19 6	17 1	20 4	...	...	...	17 17	17 17	15 9
4. Nether Boyndlie	.	22 10	26 5	27 6	26 16	25 4	24 2	26 5	26 5	21 19
5. Stonebriggs	27 3	24 6	20 4	19 14	22 0	...	21 9
6. Burnthill	11 5	10 1	10 11	14 3	12 7	16 5	14 11	7 5
7. Middlemuir	.	15 6	21 3	21 4	24 7	15 6	11 15	15 6	18 9	2 2
Average	.	17 5	17 15	19 9	19 5	18 5	16 12	18 14	18 14	12 16

NOTES.

- Soil*, light black, on poor red sandy subsoil overlying clay. *Crop*, Aberdeen bullock yellow; sown June 20, lifted Dec. 17. Rotten turnips. Plot 1 = 135; 2 = 315; 3 = 105; 4 = 115; 5 = 180; 6 = 195; 7 = 75; 8 = 135; 9 = 15.
- Soil*, light, black, on gravel. *Crop*, yellows; sown June 18, lifted Jan. 14. Rotten turnips. Plot 1 = 80; 2 = 30; 3 = 165; 4 = 30; 5 = 75; 6 = 270; 7 = 60; 8 = 0; 9 = 180.
- Soil*, mixed yellow. *Crop*, large golden yellow; sown June 8, lifted Dec. 16.
- Soil*, light black. *Crop*, red-top yellow fleshed; sown June 15, lifted Dec. 19. Rotten turnips. Plot 3 = 15; 5 = 75; 7 = 30. Other plots all sound.
- Soil*, heavy loam. *Crop*, green-top yellow; sown June 4, lifted Dec. 16. Drain burst on plots 1, 2, and 8.
- Soil*, sharp gravelly. *Crop*, Aberdeen yellow.
- Soil*, clay loam. *Crop*, Smith's Aberdeen bullock; sown June 7, lifted Dec. 19. Rotten turnips. Plot 4 = 60; 5 = 105; 6 = 75; 7 = 15; 8 = 180; 9 = 135.

TABLE III.—EXPERIMENT VIII. C. STRATHBOGIE, INSCH, AND INVERURIE DISTRICTS.

No. of plot . . .	1	2	3	4	5	6	7	8	9
Manures . . .	Bone-meal ½ nitrate	Super Nitrate	Slag Nitrate	Super and slag Nitrate	Super and slag Double nitrate	Bone-meal ½ sulphate of ammonia	Super Sulphate of ammonia	Super and slag ...	Nothing
	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Craigwillie, Huntly	18 15	20 11	21 14	22 3	21 10	20 9	21 7	20 14	18 14
2. Arnhall	14 11	17 13	18 15	...	19 0	15 1	16 6	...	...
3. Corsiestone "	20 17	23 12	23 0	24 0	23 15	21 7	...	...	...
4. Aulton, Inch .	14 18	18 10	18 15	19 1	20 13	17 17	...	13 17	3 6
5. Myreton , , .	12 10	13 6	12 13	13 9	15 2	14 14	14 6	13 4	6 2
6. Nether Blackhall, Inverurie	16 5	17 18	17 18	15 19	13 11	14 5	14 9	14 5	13 4
7. Conglass "	18 8	20 11	20 10	21 13	20 3	18 12	18 18	20 10	4 9
Average . . .	15 18	18 1	18 7	18 9	18 7	16 16	17 1	16 10	9 3

NOTES.

Crop, green-top yellow for all.

1. *Soil*, heavy brown loam, with clay subsoil. After three years grass.

Dunged land adjacent grew no heavier a crop than the plots. Wet autumn checked growth.

2. *Soil*, clay on retentive subsoil. Finger-and-toe somewhat prevalent.3. *Soil*, light dry on granite.4. *Soil*, light on gravel, 800 feet above sea. Lifted Jan. 26.5. *Soil*, light loam on panny bottom.6. *Soil*, loam on diorite rock. Adjacent part of field, with artificials at 32s. per acre and 16 yards dung, grew 22 tons 1 cwt.

TABLE IV.—EXPERIMENT VIII. C. ROSS AND CROMARTY AGRICULTURAL EXPERIMENT CLUB.

No. of plot .	1	2	3	4	5	6	7	8	9
Manures	Bone-meal ($\frac{1}{4}$ nitrate)	Super Nitrate	Slag Nitrate	Super and slag Nitrate	Super and slag Double nitrate	Bone-meal $\frac{1}{4}$ sulphate of ammonia	Super Sulphate of ammonia	Super and slag ...	Nothing
	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Fodderly	17 6	16 0	15 14	15 3	16 17	14 14	15 17	15 10	13 14
2. Cullisse	17 11	17 7	18 1	18 5	18 7	16 1	15 0	11 2	12 18
3. Coul House	11 11	19 14	18 11	21 1	20 7	14 12	20 5	17 14	...
4. Cerntown	16 10	...	16 0	16 13	18 0	14 2	16 13	16 19	12 6
5. Lower Tarrel	12 0	17 4	16 0	16 17	17 15	14 7	17 4	17 18	12 7
6. Meikle Tarrel	20 5	20 16	22 0	20 13	20 17	20 17	21 1	22 0	19 15
7. Meikle Rhynie	17 8	17 11	16 3	18 11	19 6	19 3	19 4	18 17	14 16
Average	16 1	18 2	17 11	18 13	18 16	16 5	17 18	17 3	14 6

NOTES.

1. *Soil*, good loam. *Crop*, Bruce's Aberdeen yellow bullock; lifted Dec.
2. *Soil*, clay and sand. *Crop*, Hellewood swede; sown May 26, lifted Feb. 1. Finger-and-toe on plots 3, 4, 5, 8.
3. *Soil*, light loam. *Crop*, Aberdeen green-top yellow; sown June 18, lifted Dec. 23. No. 9 made no progress after stinging, owing to cold wet season.
4. *Soil*, sandy. *Crop*, Aberdeen green-top yellow; sown June 22, lifted Dec. 16. Grown after potatoes, which had 25 loads dung per acre. Season unusually cold.
5. *Soil*, middling loam. *Crop*, purple-top swede; sown June 2; lifted Dec. 20.
6. *Soil*, black loam. *Crop*, Aberdeen green-top yellow; sown June 11, lifted Jan. 13.
7. *Soil*, black loam on clay. *Crop*, purple-top swede. Finger-and-toe appeared on all plots except No. 9, worst on plots 1, 2, and 7.

TABLE V.—EXPERIMENT VIII. C. HUMBLE EXPERIMENTAL CLUB.

No. of plot	Manures . . .	1	2	3	4	5	6	7	8	9
		Bone-meal $\frac{1}{2}$ nitrate	Super Nitrate	Slag Nitrate	Super and slag Nitrate	Super and slag Double nitrate	Bone-meal $\frac{1}{2}$ sulphate of ammonia	Super Sulphate of ammonia	Super and slag ...	Nothing
		tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Humble	.	9 10	15 0	12 15	12 10	15 5	11 3	14 2	14 9	4 14
2. Campdown	.	15 4	17 18	17 18	18 14	19 15	16 11	18 3	17 12	14 14
3. Windymains	.	18 2	22 3	18 13	21 6	20 9	22 3	20 9	20 0	19 5
4. Upper Keith	.	14 11	16 13	17 10	18 6	19 3	16 6	17 11	16 4	14 9
5. Ewingston	.	15 1	16 17	21 3	16 17	18 17	16 17	20 17	18 5	16 3
6. Stobahiel	.	14 10	21 5	19 0	15 5	16 10	14 5	...	15 5	10 15
Average	.	14 10	18 6	17 17	17 3	18 7	16 6	18 4	16 19	18 7

NOTES.

At Campdown, the crop was purple-top swedes; all the others, Aberdeen yellows.

1. *Soil*, yellow clay. Lifted Dec. 19.
 2. *Soil*, clay loam. Sown May 9, lifted Dec. 24.
 3. *Soil*, light loam. Sown May 30, lifted Nov. 22. Plot 1 injured by rabbits.
 4. *Soil*, light loam. Sown June 4, lifted Nov. 12.
 5. *Soil*, sandy loam. Sown June 6, lifted Nov. 14. Plots 1, 6, and 9 backward at first.
 6. *Soil*, light. Sown May 26, lifted Nov. 19.

TABLE VI.—EXPERIMENT VIII, C. LAUDERDALE AGRICULTURAL SOCIETY.

No. of plot	1	2	3	4	5	6	7	8	9
	Bone-meal ($\frac{1}{2}$ nitrate)	Super Nitrate	Slag Nitrate	Super and slag Nitrate	Super and slag Double nitrate	Bone-meal $\frac{1}{2}$ sulphate of ammonia	Super Sulphate of ammonia	Super and slag ...	Nothing
	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Boon . . .	9 4	10 0	11 2	10 18	11 13	11 0	10 2	8 19	6 2
2. Do. . . .	8 5	9 17	10 1	10 1	11 14	9 3	10 17	10 0	...
3. Newbigging .	16 10	18 15	18 15	19 5	18 15	16 0	18 5	17 0	14 0
4. Wintonwalls .	14 2	13 16	14 2	14 13	16 0	...	...	10 5	...
5. Lauder Barns .	11 3	12 12	14 11	13 8	19 2	15 7	13 15	14 7	8 10
6. West Mains .	12 0	17 12	14 17	13 10	17 5	12 12	16 16	11 10	...
7. Do. . . .	13 18	17 15	16 12	16 12	18 15	15 14	16 1	15 0	...
8. Newmills .	6 15	12 2	12 0	12 0	13 5	5 10	9 10	8 10	...
Average . . .	11 9	14 1	14 0	13 16	15 15	12 3	13 14	11 19	...

NOTES.

- 1, 2. *Soil*, light gravelly loam. *Crop*, Old Meldrum yellow; sown June 21, lifted Feb. 2. 6. *Soil*, heavy loam. *Crop*, Fosterton hybrid; sown June 11, lifted Nov. 4.
3. *Soil*, light loam. *Crop*, Aberdeen yellow; sown June 18, lifted Nov. 29. 7. *Soil*, loam. *Crop*, Aberdeen green-top yellow; sown June 18, lifted Nov. 26.
4. *Soil*, very light, gravelly. *Crop*, Fosterton hybrid; sown June 14, lifted Dec. 24. 8. *Soil*, heavy loam. *Crop*, Aberdeen green-top yellow; sown June 16, lifted Dec. 21.
5. *Soil*, clay loam. *Crop*, Fosterton hybrid; sown June 16, lifted Nov. 25.

TABLE VII.—EXPERIMENT VIII. C. MID-ANNANDALE AGRICULTURAL SOCIETY.

No. of plot Manures . . .	1 Bone-meal ½ nitrate	2 Super Nitrate	3 Slag Nitrate	4 Mixed Nitrate	5 Mixed Double nitrate	6 Bone-meal ½ sulphate of ammonia	7 Super Sulphate of ammonia	8 Super and slag ...	9 Nothing
	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Ferneyclough .	14 10	18 10	13 15	16 15	18 5	15 5	18 5	16 0	8 0
2. Hangingshaw .	14 0	15 10	12 15	18 5	18 15	15 5	15 10	18 10	13 15
3. Broomhills .	11 5	13 10	14 5	14 0	13 10	15 10	13 10	11 0	13 10
4. Dixons .	13 10	17 15	12 10	13 5	16 10	12 10	14 10	12 10	5 5
5. Castlemilk .	15 10	19 5	18 0	18 10	16 5	18 10	13 0	12 10	12 0
6. Poolhouses .	15 15	12 15	17 5	14 0	17 5	17 5	12 15	11 15	11 0
7. Castlemilk town .	19 10	22 15	17 10	23 10	22 10	23 0	18 0	20 15	13 5
8. Castlemilk Mill .	20 10	21 0	23 15	25 5	28 15	21 5	23 0	24 15	21 18
Average . . .	15 11	17 12	16 4	17 14	18 19	17 4	16 1	16 0	12 6

NOTES.

- Soil*, light croft land. *Crop*, Aberdeen yellow. *General crop* had 8 tons dung per acre, and produced 16 tons 14 cwt.
- Soil*, light loam. *Crop*, Fosterton's. *General crop*, with dung and 8 cwt. dissolved bones, grew 18½ tons per acre.
- Soil*, red sharp land. *Crop*, Aberdeen yellow. *General crop*, with 18 loads dung and 6 cwt. superphosphates, grew 20 tons per acre.
- Soil*, black clay. *Crop*, improved green-top yellow bullock. *General crop*, with dung and Manchester manure, grew 21 tons per acre.
- Soil*, clay. *Crop*, Aberdeen yellow.
- Soil*, dry croft and clay. *Crop*, Aberdeen green-top yellow.
- Soil*, light sharp on hard till. *Crop*, Aberdeen yellow. *General crop*, with 15 loads dung, raw bone-meal 4 cwt., superphosphate 3 cwt., nitrate 3 cwt., grew 22 tons per acre.
- Soil*, croft land on gravel. *Crop*, Aberdeen green-top yellow, improved. *General crop*, with 17 tons dung and 7 cwt. compound bone manure, grew 29 tons per acre.

In this district the experimental plots were all sown at the end of May or beginning of June and lifted the first week of November.

TABLE VIII.—EXPERIMENT VIII. C. KINCARDINESHIRE FARMERS' ASSOCIATION.

No. of plot	1 Bone-meal { ½ nitrate	2 Super Nitrate	3 Slag Nitrate	4 Mixed Nitrate	5 Mixed Double nitrate	6 Bone-meal ½ sulphate of ammonia	7 Super Sulphate of ammonia	8 Super and slag ...	9 Nothing
1. Lungair	tons cwt. 13 12	tons cwt. 15 10	tons cwt. 12 1	tons cwt. 13 19	tons cwt. 13 16	tons cwt. 16 7	tons cwt. 15 15	tons cwt. 14 1	tons cwt. ..
2. Mains of Cowie	20 13	20 3	20 9	21 10	18 14	22 3	21 4	20 8	..
3. Mains of Caterline	13 10	16 13	22 8	22 0	14 0	18 0	21 0	16 10	...
4. Raemoir, Banchory	22 0	22 16	23 7	23 17	25 19	22 14	24 17	23 18	19 13
5. The Green, Raemoir	10 18	9 1	13 6	11 10	9 10	11 14	12 16	12 8	...
6. Easter Muchalls	24 3	24 5	22 10	19 5	21 3	21 6	18 10	19 10	11 14
7. Cairnhill	15 14	15 14	16 8	14 14	13 10	11 12	10 1	11 5	9 7
Average	17 4	17 14	18 13	18 2	16 13	17 14	17 14	17 0	...

NOTES.

1. *Soil*, strong loam on clay. *Crop*, green-top yellow; sown June 7, lifted Dec. 30.
2. *Soil*, black loam. *Crop*, green-top yellow; sown June 18, lifted Jan. 18.
3. *Soil*, brown loam. *Crop*, green-top yellow; sown June 21, lifted Feb. 23.
4. *Soil*, medium loam. *Crop*, green-top yellow; sown June 8, lifted Jan. 18.
5. *Soil*, light black, poor. *Crop*, green-top yellow; sown June 9, lifted Feb. 4.
6. *Soil*, black. *Crop*, early field yellow; sown June 3, lifted Dec. 21.
7. *Soil*, light black, on panny subsoil. *Crop*, green-top yellow; sown June 8, lifted Feb. 6.

TABLE IX.—EXPERIMENT VIII. C. STRATHEARN FARMERS' ASSOCIATION.

No. of plot	1	2	3	4	5	6	7	8	9
Manures . . .	Bone-meal ½ nitrate	Super Nitrate	Slag Nitrate	Mixed Nitrate	Mixed Double Nitrate	Bone-meal ½ sulphate of ammonia	Super Sulphate of ammonia	Super and slag ...	Nothing
1. Balgarvie . . .	tons cwt. 22 0	tons cwt. 24 8	tons cwt. 18 11	tons cwt. 21 14	tons cwt. 22 0	tons cwt. 20 17	tons cwt. 20 11	tons cwt. 21 5	tons cwt. 18 2
2. Burnbank . . .	16 10	20 10	16 10	17 16	20 7	15 10	16 15	14 17	6 10

NOTES.

1. *Soil*, free black loam. *Crop*, Aberdeen yellow; sown June 15, lifted Dec. 19. Plots were situated in middle of a field on a perfectly uniform piece of land. Plot 5 looked best during summer, but later there was little difference to be seen among the manured plots. All plots perfectly healthy.
2. *Soil*, sandy loam. *Crop*, Drummond's improved early yellow; sown June 16, lifted Nov. 5. But for attack of fly the crops would have been heavier. The attack very uniform over all the plots.

THE MANURING OF TURNIPS WITH NITROGENOUS MANURES.

AS SHOWN BY FIELD EXPERIMENTS THROUGHOUT SCOTLAND IN 1892.

By Dr A. P. AITKEN.

EXPERIMENT IX. B.

The object of this experiment is to test the relative merits of nitrate of soda and of sulphate of ammonia as a soluble nitrogenous manure for the turnip crop, and to discover the most advantageous way of applying them.

A similar experiment was tried in 1891, but its success was greatly interfered with by the wet weather. It was thought that a modification of that experiment during a different season might yield information of some value.

The modification was as follows. A general turnip manure of the following composition formed the basis, viz. :—

	Cwt. per acre.
Thomas-slag, at the rate of	5
Fine bone-meal, „	1
Superphosphate, „	1
Sulphate of potash, „	1

This was a heavy dressing, but it was for application to land that had not been dunged, and in most cases to land in poor condition. The above mixture was applied as a general manure to the plots under experiment.

To one-half of the plots nitrate of soda (120 lb. per acre) was applied, and to the other half sulphate of ammonia in equivalent quantity (86 lb. per acre). The former was called section A, and the latter section B, consisting each of five plots. To four plots on each section the nitrate and the sulphate respectively were applied at stated times, viz. :—

- Plot 1. The whole applied along with the seed.
- „ 2. The whole applied ten days after singling.
- „ 3. The whole applied six weeks after singling.
- „ 4. One-half applied with the seed, and the other six weeks after singling.
- „ 5A. No nitrogenous manure at all, but only the general manure.
- „ 5B. No nitrogenous manure at all, but only the phosphates of the general manure.

The experiments were tried in six different districts, but at one of these (Ross and Cromarty) the results were few and not very reliable. The returns of the other five districts are summarised on the accompanying table.

EXPERIMENT IX. B.—GENERAL RESULTS.

Section A.—*Nitrate of Soda*.

No. of plot	1	2	3	4	5	6
Time of application	Along with seed.	10 days after singing.	6 weeks after singing.	$\frac{1}{2}$ with seed, $\frac{1}{2}$ 6 weeks after singing.	Phosphate and potash only.	Nothing
	tons cwt.	tons cwt	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Vale of Alford	23 17	22 7	21 14	22 13	21 10	...
2. Turriff	20 7	20 10	19 0	20 9	17 12	...
3. Aberdour	18 1	16 11	17 14	18 13	16 9	...
4. Huntly and Inverurie	20 4	19 6	19 13	19 8	18 19	...
5. Mid-Annandale	18 16	16 10	16 17	17 7	19 2	...
Average of 42 experiments	20 5	19 1	19 0	19 14	18 14	...

Section B.—*Sulphate of Ammonia.*

	22 7	21 12	21 19	22 6	Phosphates only.	
1. Vale of Alford	22 7	21 12	21 19	22 6	21 9	...
2. Turriff	19 10	18 16	17 7	19 0	16 2	9 8
3. Aberdour	19 10	17 18	15 10	19 1	17 6	10 10
4. Huntly and Inverurie	20 1	19 2	19 1	19 2	16 12	8 0
5. Mid-Annandale	18 7	18 0	16 18	17 8	16 14	13 2
Average of 42 experiments	19 19	19 2	18 3	19 7	17 12	12 0

Section B.—*Sulphate of Ammonia*.

It is evident that a satisfactory answer is given to the inquiry in so far as it is possible to answer it in one season. The nitrate of soda has a trifling advantage over the sulphate of ammonia as regards the weight of roots produced per acre, but the difference is not worth considering. On some soils the one was better and on others the other. A much more important thing than the actual weight of bulbs in this case is the fact recorded by many of the experimenters that the section manured with sulphate of ammonia produced a sounder turnip than that manured with nitrate of soda. This is an important confirmation of the results obtained at the Society's Experimental Station at Pumpherstons.

As regards the method of applying these two manures, it is shown that in a somewhat dry and certainly cold and backward season it is better to apply them at the time of putting in the seed. Nearly as good results have been got by applying them in two halves—the one-half with the seed and the other at a later period. It is probable that if the second half had been applied a little earlier the result would have been better. Six weeks after singling, especially in a backward season, is too late. It was reported by many of the experimenters that plot 4 improved rapidly after the second application, and that it would probably have been the best plot of all if its progress had not been suddenly checked by the severe frost which occurred on 22d September. But for that unfortunate circumstance the crop might have continued growing for three or four weeks. It would evidently have been better if the second application had been made a month instead of six weeks after singling. It was well into July before most of the plots were singled, so that the second application was in most cases made at the end of August. The middle of August would have been better while the weather was still warm and the hours of daylight not yet much curtailed. It is very important that the nourishment at the roots of the crop should be abundant at the time when the conditions above-ground as regards light and heat are at their best. During the short days and low temperature of October and November there is very little of the sun's energy being stored in the turnip crop, even if no frost occurs to injure the plants and permanently disorganise their circulation, and it would be a prudent thing to regard the manufacture of food as finished by that time. The latter half of November should, if possible, find the crop all covered up and protected from injury; for it is pretty certain that any growth in December will be far more than balanced by the manifold damage sustained during the winter.

A subordinate part of the experiment is that shown on Plot 5. It is shown that in most cases the addition of potash to a turnip crop that has got no farmyard manure is beneficial.

But there is still wanted an experiment to show when it should be applied. It has had no good effect on many farms, but probably if it had been put on the land in autumn or winter it would have been of greater service.

VALE OF ALFORD AGRICULTURAL ASSOCIATION.

Experimenters.

Mr GEORGE F. BARRON, Meikle Endovie, Alford, *Secretary*.
Mr JOSEPH BROWN, Little Endovie, Alford.
Mr JAMES CRAN, Knockandoch, Whitehouse.
Mr ALEXANDER GRASSICK, Knowehead, Towie.
Mr CHARLES MACINTOSH, Cairnballoch, Alford.
Mr CHARLES OGG, Baltimore, Glenbucket.
Mr JOHN REID, Nether Kildrummy, Kildrummy.
Mr JOHN ROBERTSON, Malteroft, Kildrummy.
Mr JAMES WALKER, Westside of Brux, Kildrummy.
Mr GEORGE WILKEN, Waterside of Forbes.

This district was somewhat favoured last year as regards weather, and the turnip crop was above average. I visited the district on the 22d July, and, along with the secretary, inspected a number of the fields. The ground had been well selected and the experiments carefully laid down. The results obtained on the eight farms where the experiments were considered reliable are on the whole quite normal. At Knockandoch finger-and-toe made its appearance; and careful notes, taken by Mr Cran, showed that the section A, which got nitrate of soda, suffered much more than section B, which got sulphate of ammonia. He reckoned that 15 per cent of the former and 4 per cent of the latter were affected by the disease. Plot 3 A suffered most, and the plots 5 A and B that got no nitrogenous manure were the healthiest. This result is corroborated by a number of farms on which Experiment VIII. C was tried in other districts; and it does seem that the application of soluble nitrogenous manures to the turnip crop renders it more liable to injury from finger-and-toe on land infected by that parasite, even where the amount applied is not excessive. Larger doses greatly aggravate the mischief, but I have not hitherto noticed that nitrate of soda renders the crop more prone to the disease than sulphate of ammonia. An irregularity noticeable in the Knockandoch experiment is the small crop on plot 1 B. It may be that this deficiency is due to the manuring, but the other results obtained in this district do not favour that view. The effect of that deficiency is to depress, perhaps unduly, the average value of plot 1 B in the report of the district. But it is evident that the nitrogenous manures all over the district have done very little for the crop; and this brings into prominence an observation that I have frequently made before, that on land containing a fair amount of organic matter the turnip

crop during a favourable turnip-growing season is very independent of nitrogenous manures.

Neither can it be said that potash has done anything for the crop, and it would seem that during such a season as occurred in the district last year a maximum crop might have been grown with an application of superphosphate alone or a mixture of it and slag.

It was noticed by some of the experimenters that the crop grown on the experimental plots was heavier and earlier than the ordinary crop to which dung and artificials had been applied.

The main result of the experiment is that the nitrate of soda and sulphate of ammonia should be put in along with the seed, either in whole or in part.

TURRIFF AGRICULTURAL ASSOCIATION.

Experimenters.

MR PETER ANDERSON, Backhills, Turriff.
 MR JOSEPH BROWN, Dorlaithers, Turriff.
 MR ADAM DAVIDSON, Boghead, Dumlucas, Turriff.
 MR ALEXANDER M. LEDDINGHAM, Fintry, Turriff.
 MR JOHN MILNE, Mains of Laithers, Turriff.
 MR WILLIAM SLESSOR, Shielburn, Inverkeithny.
 MR ALEXANDER SLESSOR, Raecloch, Turriff.
 MR DAVID DAVIDSON, Cebra, Mintlaw.

In this experiment, as in Experiment VIII. C in the same district, the sulphate of ammonia has proved inferior to nitrate of soda, although the superiority is probably exaggerated owing to the heavy crops got on Raecloch, which were estimated from the weight of $\frac{1}{2}$ lb of an acre, where a small accidental superiority on the section weighed would introduce considerable error, otherwise the results are normal.

ABERDOUR AGRICULTURAL ASSOCIATION.

Experimenters.

MR WILLIAM CHAPMAN, Woodhead, Aberdour, *Secretary*.
 MR HUGH FRASER, New Aberdour, Fraserburgh.
 MR HUGH GORDON, Bridgend, Tyrie, Fraserburgh.
 MR ALEX. LOVIE, Nether Boydellie, Fraserburgh.
 MR ALEXANDER MORISON, Stonebriggs, Fraserburgh.
 MR DAVID WATSON, Burnhill, Fraserburgh.
 MR WILLIAM WATSON, Middlemuir, Strichen.
 MR WILLIAM CARDNO, Tillinamoult, Tyrie, New Pittsligo.

As in the case of Experiment VIII. C. in this district, the sulphate of ammonia did rather better than nitrate of soda, and most of the experimenters record that the soundest turnips were grown with sulphate of ammonia; so that the real weight of useful fodder grown on section B. was probably much greater than the weights given would indicate.

Unfortunately this experiment, as well as the other at

Tillinamoult, was so badly affected with finger-and-toe that the results were useless.

Potash seems to have done more harm than good, otherwise the results are normal.

STRATHBOGIE, INSCH, AND INVERURIE DISTRICTS.

Experimenters.

Mr JOHN DUNCAN, Downin, Huntly.

Mr JAMES MERSON, Craigwilie, Huntly.

Mr JAMES WILSON, Arnhall, Huntly.

Mr WILLIAM SCOTT, Corsiestone, Huntly.

Mr WILLIAM DURNO, Aulton, Inch.

Mr GEORGE BRUCE, Heatherwick, Inverurie.

Mr GEORGE FERGUSON, Lumphart, Daviot.

Mr JAMES FOWLER, Nether Blackhall, Inverurie.

Mr JAMES STEPHEN, Conglass, Inverurie.

Mr LESLIE DURNO, Mains of Glack, Old Meldrum.

The extreme lateness of the harvest, which reached into December, delayed the time of lifting. There was a fairly heavy crop on the plots of Experiment IX., and they would have been heavier still had not the growth been suddenly stopped by the severe frost, which came on in the latter part of September. The nitrogenous manures had altogether very little effect on the growth, but that applied with the seed did best.

ROSS AND CROMARTY AGRICULTURAL EXPERIMENT CLUB.

Experimenters.

Mr JAMES A. GORDON, Arabella.

Mr JOHN GORDON, Cullisae, Nigg.

Mr COLIN MUNRO, North Tarrel.

Mr JOHN ROSS, Meikle Tarrel.

Mr THOMAS DOUGLAS, Meikle Rhyne.

Owing to causes referred to under Experiment VIII. C., the experiments in this district were very unsatisfactory. The experiment at Arabella is the only one of the set which gives results similar to those got elsewhere. The others bear internal evidence of disturbance from one cause or another, so that they cannot be relied on to give information of any value in the investigation, and it would serve no good purpose to take their average.

MID-ANNANDALE AGRICULTURAL SOCIETY.

All the experimenters in the district carried out both Experiments VIII. C and IX. B. The method employed has already been referred to, and the examination of the results obtained in this experiment show that they are irregularities which are probably due to the method, but the general results are like those elsewhere.

TABLE I.—EXPERIMENT IX. B. VALE OF ALFORD AGRICULTURAL ASSOCIATION.

A.—*Nitrate of Soda*.

No. of plot Time of application	1 Along with seed.	2 10 days, after singing.	3 6 weeks after singing.	4 $\frac{1}{2}$ with seed, $\frac{1}{2}$ week, after singing.	5 Phosphate, and potash.	6 Nothing.
		tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Meikle Endovie	.	23 12	23 17	24 8	23 11	...
2. Little Endovie	.	26 11	24 17	27 4	24 17	...
3. Knockandoch	.	15 12	14 15	14 3	14 5	...
4. Knowehead	.	22 1	20 17	23 16	21 7	...
5. Cairnballoch	.	21 16	22 6	22 15	22 4	...
6. Nether Kildrumny	.	23 4	22 13	22 10	20 0	...
7. Maltercroft	.	23 18	22 10	22 2	22 2	...
8. Westside of Brux	.	27 8	23 11	24 5	25 0	...
Average	.	23 0	22 7	22 13	21 10	...
B.— <i>Sulphate of Ammonia</i> .						
1. Meikle Endovie	.	22 1	24 17	22 10	25 0	...
2. Little Endovie	.	28 1	25 5	25 18	25 5	21 10
3. Knockandoch	.	13 2	16 2	15 9	13 6	...
4. Knowehead	.	22 17	21 3	22 6	22 4	...
5. Cairnballoch	.	22 11	22 9	22 10	20 19	4 2
6. Nether Kildrumny	.	22 10	20 7	22 10	19 12	15 14
7. Maltercroft	.	21 15	22 2	22 17	22 10	17 2
8. Westside of Brux	.	26 1	22 17	25 0	23 18	23 10
Average	.	22 7	21 19	22 6	21 9	...

NOTES.

Crop over all was yellow turnips.

1. *Soil*, light black loam. Sown June 6, lifted Dec. 22.2. *Soil*, light loam. Sown June 6, lifted Dec. 22.3. *Soil*, alluvial. Sown June 13, lifted Jan. 24. Finger-and-toe appeared, especially among nitrated plots.4. *Soil*, light clay. Sown June 4, lifted Dec. 22.5. *Soil*, loam. Sown June 6, lifted Dec. 22.6. *Soil*, light loam. Sown June 15, lifted Dec. 22.7. *Soil*, light loam on gravel. Sown June 1, lifted Dec. 22.8. *Soil*, deep loam. Sown May 31, lifted Dec. 22.

TABLE II.—EXPERIMENT IX. B. TURRIFF AGRICULTURAL ASSOCIATION.

A.—Nitrate of Soda.

No. of plot Time of application . . .	1 Along with seed.	2 10 days after sowing.	3 6 weeks after sowing.	4 $\frac{1}{2}$ with seed, $\frac{1}{2}$ 6 weeks after sowing.	5 Phosphate and pota-h.	6 Nothing
	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Backhills . . .	17 17	21 19	19 11	21 5	17 6	...
2. Doriaithers . . .	15 4	14 11	14 5	13 10	11 3	...
3. Boghead, Dumlugas . . .	19 14	20 4	20 11	19 13	19 11	...
4. Fintry . . .	20 18	19 14	18 7	20 12	18 18	...
5. Mains of Leithers . . .	20 0	20 4	19 15	19 5	19 12	...
6. Raecloch . . .	28 11	28 4	21 19	29 9	17 17	...
7. Cabra . . .	20 1	18 17	18 13	19 5	19 0	...
Average . . .	20 7	20 10	19 0	20 9	17 12	...

B.—Sulphate of Ammonia.						
1. Backhills . . .	17 10	19 5	17 6	20 0	13 18	8 8
2. Doriaithers . . .	15 3	12 16	12 18	14 8	11 10	4 15
3. Boghead, Dumlugas . . .	19 19	19 9	19 10	20 13	17 14	1 6
4. Fintry . . .	21 4	21 7	18 15	20 7	16 14	14 14
5. Mains of Leithers . . .	19 14	20 15	18 8	18 11	19 3	13 0
6. Raecloch . . .	23 10	20 3	18 11	20 3	15 14	15 0
7. Cabra . . .	19 11	17 3	16 0	18 18	17 9	10 10
Average . . .	19 10	18 16	17 7	19 0	16 2	...

NOTES.

1. Soil, light loam. Crop, golden yellow; sown June 7, lifted Jan. 27.
2. Soil, poor black. Crop, Aberdeen yellow; sown June 4, lifted Jan. 29.
3. Soil, sandy loam on sandy clay. Crop, Sittytoun purple-top yellow; sown June 10, lifted Dec. 19.
4. Soil, gravelly loam. Crop, green-top yellow; sown June 6, lifted Jan. 23.
5. Soil, clay slate loam. Crop, Aberdeen bullock yellow; sown June 9, lifted Dec. 23.
6. Soil, heavy clay loam. Crop, Aberdeen bullock yellow; sown June 15, lifted Jan. 26.
7. Soil, sandy loam. Crop, yellows; sown June 14, lifted Jan. 24.

TABLE III.—EXPERIMENT IX. B. ABERDOUR.

A.—*Nitrate of Soda*.

No. of plot Time of application . . .	1 Along with seed.		2 10 days after sowing.		3 6 weeks after sowing.		4 ½ with seed, ½ weeks after sowing.		5 Phosphate and potash.		6 Nothing.	
	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Woodhead . . .	12 17	12 6	15 11	15 0	15 0	15 0	15 0	15 0	15 0	15 0	15 0	15 0
2. New Aberdour . . .	15 10	17 8	18 15	19 6	19 6	19 6	19 6	19 6	19 6	19 6	19 6	19 6
3. Bridgend, Tyrie . . .	10 18	11 9	12 10	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16	16 16
4. Nether Boydnie . . .	24 2	24 2	22 0	25 3	25 3	25 3	25 3	25 3	25 3	25 3	25 3	25 3
5. Stonebriggs . . .	26 0	15 15	17 9	18 11	18 11	18 11	18 11	18 11	18 11	18 11	18 11	18 11
6. Burnthill . . .	16 11	18 0	19 3	18 11	18 11	18 11	18 11	18 11	18 11	18 11	18 11	18 11
7. Middlemuir . . .	20 7	17 2	18 9	17 8	17 8	17 8	17 8	17 8	17 8	17 8	17 8	17 8
Average . . .	18 1	16 11	17 14	18 13	18 13	18 13	18 13	18 13	18 13	18 13	18 13	18 13
B.— <i>Sulphate of Ammonia</i> .												
1. Woodhead . . .	21 9	21 19	18 4	15 10	15 10	15 10	15 10	15 10	15 10	15 10	15 10	15 10
2. New Aberdour . . .	12 6	13 18	10 7	20 18	20 18	20 18	20 18	20 18	20 18	20 18	20 18	20 18
3. Bridgend, Tyrie . . .	23 0	22 10	21 9	25 14	25 14	25 14	25 14	25 14	25 14	25 14	25 14	25 14
4. Nether Boydnie . . .	24 6	11 14	12 17	19 14	19 14	19 14	19 14	19 14	19 14	19 14	19 14	19 14
5. Stonebriggs . . .	20 11	17 12	17 10	17 17	17 17	17 17	17 17	17 17	17 17	17 17	17 17	17 17
6. Burnthill . . .	21 3	14 14	15 6	18 7	18 7	18 7	18 7	18 7	18 7	18 7	18 7	18 7
7. Middlemuir . . .	19 10	17 15	15 10	19 1	19 1	19 1	19 1	19 1	19 1	19 1	19 1	19 1
Average . . .	19 10	17 15	15 10	19 1	19 1	19 1	19 1	19 1	19 1	19 1	19 1	19 1

NOTES.

1. *Soil*, light black on sand and clay. Lifted Dec. 17. 3 and 4 would have been much heavier but for wet cold weather.
2. *Soil*, light black on gravel. Lifted Jan. 14.
3. *Soil*, mixed yellow. Lifted Dec. 16.
4. *Soil*, light black. Lifted Dec. 19.
5. *Soil*, heavy loam. Lifted Dec. 16.
6. *Soil*, shallow gravelly. Lifted Dec. 16. Turnips manured with sulphate of ammonia were the soundest.
7. *Soil*, loam. Lifted Dec. 19. But for frost, plots 3 and 4 would have been the best.

TABLE IV.—EXPERIMENT IX. B. STRATHBOGIE, INSCH, AND INVERURIE DISTRICTS.

A.—*Nitrate of Soda*.

No. of plot Time of application . . . {	1 Along with seed.	2 10 days after singling.	3 6 weeks after singling.	4 $\frac{1}{2}$ with seed, $\frac{3}{4}$ weeks after singling.	5 Phosphates and potash.	6 Nothing.
		tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Downin	25 11	26 17	23 1	24 0	24 13	...
2. Craigwillie	20 9	19 14	20 18	20 10	20 12	...
3. Arnhall	19 0	19 14	19 14	16 17	18 6	...
4. Corsiestone	24 9	24 9	24 6	25 16	25 15	...
5. Aulton	18 6	16 2	18 12	16 12	16 6	...
6. Heatherwick	20 8	19 13	19 7	18 13	20 0	...
7. Lumphart	19 2	15 0	...	19 2	17 10	...
8. Nether Blackhall	20 10	18 11	19 2	19 12	17 11	...
9. Conglass	21 9	21 5	20 8	21 4	19 0	...
10. Mains of Glack	13 4	12 2	11 9	11 14	10 5	...
Average	20 4	19 6	19 13	19 8	18 9	...

B.—*Sulphate of Ammonia.*

	22	6	24	0	23	8	23	2	21	12	15	1
1. Downin	22	6	24	0	23	8	23	2	21	12	15	1
2. Craigwillie	21	5	19	14	21	7	21	19	20	5	...	
3. Arnhall	18	11	19	14	20	14	20	9	18	13	...	
4. Corsiestone	25	12	25	13	24	15	24	8	25	4	...	
5. Aulton	16	14	17	8	16	16	16	10	10	8	...	
6. Heatherwick	21	18	17	1	15	10	15	11	13	18	...	4
7. Lumphart . . . . .	...		16	17	15	3	18	11	15	14	7	
8. Nether Blackhall	18	17	19	5	20	8	18	13	12	11	...	9
9. Conglass	22	17	19	12	21	10	22	5	20	11	4	0
10. Mains of Glack	12	8	11	11	11	4	9	14	7	5	3	
Average	20	1	19	2	19	1	19	2	16	12	...	

NOTES.

Crop, Aberdeen green top yellow.

- | | |
|--------------------------------------------------------------|-------------------------------------------------------------------------|
| 1. <i>Soil</i> , friable loam on red subsoil. | |
| 2. <i>Soil</i> , heavy brown loam on clay. | Rest of field, with 25 yards dung per acre, no better than these plots. |
| 3. <i>Soil</i> , clay loam. Finger-and-toe rather prevalent. | |
| 4. <i>Soil</i> , light clay loam. | |
| 5. <i>Soil</i> , light sandy loam. | |
| 6. <i>Soil</i> , loamy on clay. | |
| 7. <i>Soil</i> , light loam on panny subsoil. | |
| 8. <i>Soil</i> , loam on blue diorite. | Experiment very favourably carried out. |
| 9. <i>Soil</i> , loam on blue diorite. | Plots 4 A and 4 B showed a good deal of canker. |
| 10. <i>Soil</i> , sandy clay. | |

TABLE V.—EXPERIMENT IX. B. ROSS AND CROMARTY EXPERIMENT CLUB.

A.—*Nitrate of Soda*.

No. of plot	Time of application	1 Along with seed.	2 10 days after singling.	3 6 weeks after singling.	4 $\frac{1}{2}$ with seed, $\frac{1}{2}$ 6 weeks after singling.	5 Phosphate and potash.
		tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Arabella	.	18 15	16 16	17 10	19 16	16 16
2. Cullisse	.	16 2	19 1	16 10	15 11	19 2
3. North Tarrel	.	16 0	16 14	18 12	16 0	10 0
4. Meikle Tarrel	.	21 2	20 10	20 8	21 0	19 0
5. Meikle Tarrel	.	22 2	20 14	20 4	18 10	15 10
6. Meikle Rhyme	.	18 10	18 7	17 1	17 7	18 17
Average						

B.—*Sulphate of Ammonia*.

1. Arabella	2. Cullisse	3. North Tarrel	4. Meikle Tarrel	5. Meikle Tarrel	6. Meikle Rhynie	Phosphates only.
20 2	15 3	14 0	19 2	23 4	19 5	21 16
19 5	18 0	18 0	19 7	21 14	18 1	17 10
19 10	15 1	12 10	18 4	16 10	17 11	12 0
18 7	16 5	18 15	18 6	20 0	18 12	16 5
						8 15
						18 6
						20 0
						18 12

NOTES.

2. Finger-and-toe prevalent, especially on 1 and 3 A and 3 B.

5. Very backward season till middle of September.

series A, and 34 on series B, plot 4 being the worst

Plot 6 A and B almost no finger-and toe.

6. Finger-and-toe appeared but not to a serious extent—viz., 80 turnips on

TABLE VI—EXPERIMENT IX. B. MID-ANNANDALE.

A.—Nitrate of Soda.

No. of plot Time of application.	. . . . .	. . . . .	{	1		2		3		4		5	
				Along with seed.		10 days after singing.		6 weeks after singling.		$\frac{1}{2}$ with seed, $\frac{1}{2}$ weeks after singling.		Phosphates and potash.	
				tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.	tons cwt.
1. Ferneydench	.	.	.	19 10	12 10	12 10	15 5	11 10	11 10				
2. Hangingshaw	.	.	.	18 15	17 10	16 15	17 10	16 10	25 10				
3. Broomhills	.	.	.	16 15	15 0	15 5	16 10	16 10	20 10				
4. Dixons	.	.	.	10 5	11 10	12 5	11 10	11 10	12 15				
5. Castlemilk	.	.	.	16 0	20 0	13 0	17 0	17 0	17 0				
6. Poolhouses	.	.	.	20 15	16 10	19 10	16 15	16 15	20 0				
7. Castlemilk town	.	.	.	20 5	16 15	25 10	19 10	19 10	23 0				
8. Castlemilk Mill	.	.	.	28 5	22 10	20 0	24 15	24 15	22 15				
Average	.	.	.	18 16	16 10	16 17	17 7	17 7	19 2				

B.—*Sulphate of Ammonia.*

	<i>B.—Sulphate of Ammonia.</i>								<i>Phosphates only.</i>					
1. Ferneycleuch . . .	17	0	11	5	13	5	14	0	16	15				
2. Hangingshaw . . .	18	10	15	10	15	10	14	0	16	15				
3. Broomhills . . .	18	10	15	10	16	10	18	10	13	5				
4. Dixons . . .	14	15	13	5	13	0	14	0	13	10				
5. Castlemilk . . .	15	0	17	5	14	15	15	15	13	10				
6. Poolhouses . . .	16	0	25	10	19	5	18	3	20	10				
7. Castlemilktown . . .	24	5	24	0	22	10	22	0	21	10				
8. Castlemilk Mill . . .	24	5	21	5	19	10	23	0	18	0				
Average . . .	18	7	18	0	16	18	17	8	16	14				

THINNING OF TURNIPS.

By Dr A. P. AITKEN.

At one of the meetings of farmers carrying out experiments with turnip manures, under the direction of the Chemical Committee of the Society, a discussion arose on the subject of singling, and it was apparent that considerable diversity of opinion existed as to the distance which should be left between the plants so as to produce the greatest amount of turnip food per acre. It was admitted that it was not a question to be decided from merely theoretical considerations, but that the heavier or lighter character of the land, the variety of turnip sown, the favourable or unfavourable nature of the season, and the prevalence of turnip-fly or other pest, would be important factors in determining what number of plants per acre would yield the best crop. Nevertheless, as it had been the custom in the district to adhere to a certain old-established system which might or might not be the best for general purposes, it was resolved to make some comparative trials on a small scale, as a preliminary to a larger investigation in future seasons.

Unfortunately the severe winter destroyed a number of the trials; but there are two from Aberdeenshire—one by Mr John Milne, Mains of Laithers, and one by Mr George A. Ferguson, Lessendrum—and one from Lauderdale by Mr R. Shirra Gibb, Boon, which deserve to be recorded.

The trials at Lessendrum and those at Mains of Laithers were carried out upon the same plan, both with swedes and yellows, and the results were as shown in Tables I. and II.

The plants were thinned at four different distances apart—viz., 3, 6, 9, and 12 inches—in the first place with a single plant left as is usual, and in the second place with two, three, and four plants left growing in a clump. When the plants are thinned so as to leave two or more growing in a clump, they compete with each other for the nourishment in the soil, and produce very small bulbs, which are not such as to satisfy the eye of any one accustomed to value his crop by an estimate of the size of the bulbs; but that is a sentiment which would soon disappear if it were found that the puny-looking two, three, or four bulbs contained more food material than the large one whose place they occupied. It is well known that very large bulbs lack solidity, and are frequently very spongy in texture towards the heart, and do not weigh so much per acre as their appearance would lead one to expect. Moreover, as the solid matter of a turnip is in great measure dependent on the

amount of roots which it can spread into the soil, it seemed probable that several plants growing together would have a larger root development than one plant, and might be found to produce bulbs which contained a greater amount of fodder in less bulk than single bulbs could accumulate. That is clearly a matter for experiment; but the experiment should not end with the weighing of the crops, for it was proved at Pumpherstons that one crop may be heavier than another and yet contain less

TABLE I.—LESSENDRUM.

Soil, heavy loam. Sown May 24, singled July 5, lifted February 9. Each plot consisted of five drills. Plants counted and weighed on 38 feet 9 inches.

SWEDES.

Plot.					No. left.	No. lifted.	Weight per acre	
							tons	cwt.
1	3 inches apart, single plants				155	146	16	10
2	6	"	"	"	76	76	18	3
3	9	"	"	"	52	52	20	17
4	12	"	"	"	38	38	17	13
5	3	"	2 plants together	"	310	244	13	5
6	6	"	2	"	155	144	16	5
7	9	"	3	"	155	152	12	5
8	12	"	4	"	155	140	16	10
GREEN-TOP YELLOWS. Soil, alluvial sandy loam.								
1	3 inches apart, single plants				155	140	15	8
2	6	"	"	"	76	76	12	19
3	9	"	"	"	52	52	18	10
4	12	"	"	"	38	38	13	17
5	3	"	2 plants together	"	310	252	15	1
6	6	"	2	"	155	130	16	12
7	9	"	3	"	155	140	17	5
8	12	"	4	"	155	154	14	1

solid matter, especially if the bulbs are very large. We would require to know how much of the crop was water and how much was solid matter; and not only so, but we should also require to know what the solid matter was composed of.

The only satisfactory way to determine the relative feeding value of bulbs grown in different ways is to make a careful feeding experiment, and note the progress made by the stock consuming them. Short of that perfect test some information

may be derived from the analysis of the bulbs grown under different conditions. In a preliminary experiment done on a small scale this latter method was the only one available.

TABLE II.—MAINS OF LAITHERS.

Soil, rich loam on clay slate. Sown May 16, singled June 30,
lifted January 26.

SWEDES.

Each plot consisted of five drills. Plants counted and weighed on
96 feet 8 inches.

Plot.		Calculated number.	No. lifted.	Weight per acre.	
				tons	cwt.
1	3 inches apart, single plants	387	333	21	3
2	6 " "	193	179	21	14
3	9 " "	129	123	22	17
4	12 " "	96	90	18	4
5	3 " 2 plants together	774	513	19	19
6	6 " 2 "	387	349	22	3
7	9 " 3 "	387	303	22	6
8	12 " 4 "	387	323	20	9
GREEN-TOP YELLOWS.					
Each plot consisted of five drills. Plants counted and weighed on 144 feet.					
1	3 inches apart, single plants	576	488	18	16
2	6 " "	288	242	15	10
3	9 " "	192	167	15	1
4	12 " "	144	149	15	18
5	3 " 2 plants together	1152	677	16	4
6	6 " 2 "	576	415	15	1
7	9 " 3 "	576	397	13	3
8	12 " 4 "	576	437	16	15

Accordingly the turnips were carefully sampled at Lessendrum and Mains of Laithers, and sent to me for analysis. The results of these analyses are given on Tables III. and IV. Before considering them, a few words are necessary regarding the progress and weights of the crops grown at the two places.

At Lessendrum, near Huntly, the conditions for turnip-growing were far more favourable than in most parts of the country, and the crop was uncommonly healthy. A comparison of the number of turnip-plants left to grow and the number of bulbs lifted, shows that remarkably few plants succumbed to disease

TABLE III.—ANALYSES OF TURNIPS THINNED AT DIFFERENT DISTANCES APART. MAINS OF LAITHERS.

	1 1 at 3 inches.	2 1 at 6 inches.	3 1 at 9 inches.	4 1 at 12 inches.	5 2 at 3 inches.	6 2 at 6 inches.	7 3 at 9 inches.	8 4 at 12 inches.
SWEDES.								
Water	89.54	89.76	89.46	90.50	88.40	90.24	89.88	90.32
Solids *	10.46	10.24	10.54	9.60	11.60	9.76	10.12	9.68
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Solids contained—								
Albumen	9.41	9.19	6.5	8.31	7.44	8.75	8.75	8.53
Amides, &c. (N × 6.25)	2.40	3.50	3.75	3.06	2.18	1.75	2.19	3.50
Carbohydrates, &c.	67.74	65.51	74.40	71.23	72.48	71.70	71.86	63.67
Woody fibre	14.75	15.50	9.15	10.60	12.00	11.90	11.70	16.00
Ash	5.70	6.30	5.95	6.80	5.90	5.90	5.50	6.30
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
* Containing sugar	4.6	5.0	4.6	4.1	7.0	5.8	5.1	5.0
YELLOW.								
Water	90.34	90.54	91.12	91.26	91.56	91.18	90.56	90.32
Solids *	9.66	9.46	8.88	8.74	8.44	8.82	9.44	9.68
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Solids contained—								
Albumen	8.31	9.41	7.87	7.44	8.31	10.72	8.97	8.06
Amides, &c. (N × 6.25)	3.28	2.84	2.41	4.81	1.97	3.03	1.53	3.31
Carbohydrates, &c.	71.36	71.60	69.82	69.15	71.62	65.65	70.35	71.13
Woody fibre	9.05	8.35	11.20	10.40	10.70	11.40	11.20	10.00
Ash	8.00	7.80	8.70	8.20	7.40	9.20	7.95	7.50
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
* Containing sugar	4.1	4.4	3.8	2.6	4.8	2.3	4.6	5.0

TABLE IV.—ANALYSES OF TURNIPS THINNED AT DIFFERENT DISTANCES APART. LESSENDRUM, HUNTLY.

	1 1 at 3 inches.	2 1 at 6 inches.	3 1 at 9 inches.	4 1 at 12 inches.	5 2 at 3 inches.	6 2 at 6 inches.	7 3 at 9 inches.	8 4 at 12 inches.
SWEDES.								
Water	89.26	89.94	89.32	89.38	88.30	88.94	88.40	88.56
Solids *	10.74	10.06	10.68	10.62	11.70	11.06	11.60	11.44
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Solids contained—								
Albumen	10.28	10.06	10.06	9.41	8.53	9.84	8.97	10.50
Amides, &c. (N × 6.25)	5.03	5.47	3.94	4.15	4.38	4.38	5.03	4.59
Carbohydrates, &c.	67.49	67.37	69.50	70.74	70.84	70.23	70.40	68.21
Woody fibre .	10.20	10.30	9.50	9.00	9.60	9.40	9.10	10.00
Ash	7.00	6.80	7.00	6.70	6.65	6.15	6.50	6.70
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
* Containing sugar	6.1	6.0	6.0	5.7	6.5	7.9	7.6	6.0
YELLOW.								
Water	91.54	90.14	92.38	91.44	90.16	91.70	91.24	91.54
Solids *	8.46	9.86	7.62	8.56	9.84	8.30	8.76	8.46
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Solids contained—								
Albumen	9.62	10.05	11.37	11.81	11.37	10.50	11.51	10.72
Amides, &c. (N × 6.25)	4.38	5.70	6.13	5.03	4.82	5.25	4.38	5.25
Carbohydrates, &c.	67.70	68.55	62.90	63.16	63.91	64.25	63.76	64.53
Woody fibre .	9.70	7.70	10.20	11.30	10.30	10.50	10.25	9.30
Ash	8.60	8.00	9.40	8.70	9.60	9.50	9.80	10.20
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
* Containing sugar	5.8	5.1	4.2	4.1	5.0	4.8	4.8	4.3

or accident. The greatest mortality was among the plants that were grown 3 inches apart, both among the swedes and the yellows. The first thing one notices is, that the heaviest crop has been got in both instances from the plots where the plants were singled 9 inches apart, but in other respects there are considerable discrepancies between the swedes and the corresponding yellows. The smallest crop of swedes was grown on plot 7, where clumps of three were left 9 inches apart, but the corresponding plot of yellows is the second best of the series. Again, plot 2 of the yellows, where the plants were singled 6 inches apart, is the worst of the series, but the corresponding plot in the swedes is the second best; yet in neither case was a single turnip awanting. These discrepancies lead one to suppose that if the experiments were tried on a larger scale the results would probably be different. The discrepancies are probably due to inequalities of soil, although the parts of the fields on which the thinning experiments were made were carefully selected as being the evenest. Each plot was 48 feet long and five drills broad, and the middle drill of each plot was selected for weighing and for analysis. In an experiment on a small scale that seems a fairly good arrangement, but over a breadth of 48 feet some five-drill plots would be more favourably placed as regards the drains than others perhaps. It was noticed by Mr Ferguson, and I also noticed at other places where the experiment was tried, that where the turnips were growing in clumps of three or four, one bulb would take the lead and grow for a while at the expense of the others; and though it ceased growing after attaining a moderate size, it retained its superiority over the others to the end.

At Mains of Laithers the number of plants in the plots having the largest number of turnips was considerably under the theoretical number. The reason of this was that although 4 lb. of good seed was sown in the case of the swedes, and 3 lb. per acre in the case of the yellows, when large enough for thinning a sufficient number of plants in the proper places was not to be found, and the largest possible number available was left. To secure a sufficiency of plants for some of the plots, at least 5 or 6 lb. of seed per acre must be sown. The plants all remained perfectly vigorous and healthy until the severe frost in the end of December, and although somewhat injured by frost, none of the bulbs, unless one or two injured by game, rotted. The plots having the largest number of plants remained much greener in the tops after the frost than those wider apart, and consequently with larger bulbs, but otherwise the smaller plants seemed to have sustained almost as much injury as the larger.

At Mains of Laithers, as at Lessendrum, the swedes singled 9 inches apart produced the largest crop, but on plots 6 and 7, where two and three plants were left at 6 and 9 inches apart respectively, the weights of bulbs per acre were not far behind them; but in the case of the yellows the closest grown turnips produced the heaviest crops on both farms.

The experiment carried out at Boon on a smaller scale than those in Aberdeenshire gave the following results:—

				Weight in 10 yards.	
				stones.	lb
4 inches apart, single plant	.	.	.	7	7
5 " "	.	.	.	7	5
6 " "	.	.	.	6	5
7 " "	.	.	.	6	3
8 " "	.	.	.	6	7
9 " "	.	.	.	6	0
10 " "	.	.	.	5	13
10 " 2 plants together	.	.	.	8	4
10 " 3 "	.	.	.	8	7
10 " 4 "	.	.	.	7	7

In this case the weighings are very markedly in favour of the closely grown turnips; and, taking the whole results into consideration, it is evident that it is quite an open question whether the usual method of thinning turnips is the one which produces the heaviest crops, and that a more extended trial is wanted in order to discover what is the system of thinning by means of which the best results can be attained.

We may now consider shortly the data provided by the analyses of the turnips grown on the various plots in Aberdeenshire.

It would evidently be inexpedient to attach great importance to those analyses, considering the limited nature of the experiment, but a general survey of the figures brings out one or two points which are worthy of consideration.

In the first place, the percentage of solids in the closely grown turnips, on plots 1, 5, 6, 7, and 8, is greater than that of the more widely grown turnips, on plots 2, 3, and 4, all over; and if we consider, not the weight of the crop lifted, but the weight of solid turnip-matter grown, we find that in three out of the four experiments the advantage rests with the closely grown turnips.

In the next place, we see that the composition of the solids does not vary very much in the large and small turnips. It might have been expected that the small bulbs would have been much more woody than the large ones; but, upon the whole, there is very little difference. The amount of albumen in the larger turnips at Lessendrum is rather more than in the small ones, but at Mains of Laithers the reverse is the case.

But the most noteworthy fact brought out by these analyses is, that in every case the percentage of sugar contained in the

closely grown turnips is considerably greater than that in the more widely grown ones.

The averages are as follows:—

PERCENTAGES OF SUGAR.

	Closely thinned turnips. Plots 1, 5, 6, 7, 8.	Widely thinned turnips. Plots 2, 3, 4.
Lessendrum—		
Swedes	6.8	5.9
Yellows	5.0	4.5
Laithers—		
Swedes	5.5	4.6
Yellows	4.2	3.6
Mean	5.3	4.6

Another noteworthy result is seen on comparing the proportions of amides and other nitrogenous non-albuminoid constituents in the small closely thinned turnips and in the larger and widely thinned ones, viz.:—

NON-ALBUMINOID NITROGENOUS CONSTITUENTS—PER CENT.

	Closely thinned turnips. Plots 1, 5, 6, 7, 8.	Widely thinned turnips. Plots 2, 3, 4.
Lessendrum—		
Swedes	4.68	4.51
Yellows	4.81	5.57
Laithers—		
Swedes	2.40	3.44
Yellows	2.62	3.49
Mean	3.63	4.25

These nitrogenous substances consist for the most part of amides, which are compounds that are converted into albumen as the plants become more mature.

As the turnip matures, not only do the amides become more and more transformed into albumen, but the carbohydrates become more and more converted into sugar; and as the closer thinned and smaller turnips contained a larger percentage of sugar and a smaller percentage of amides than the larger and wider thinned ones, we are justified in concluding that they were riper. If that fact is borne out by similar experiments done on a larger scale, it is evidently one of no little importance; for early ripening, if consistent with the obtaining of a full crop, is especially valuable in the case of the turnip crop, which suffers more than others from injury in the late autumn. Another important point which has not been tested in this preliminary trial, but which ought to receive attention when a larger experiment is undertaken, is the relative keeping qualities of turnips thinned in different ways and lifted at different times. Any method of cultivation that will have the effect of causing turnips to ripen earlier, and to keep better through the winter, would be a great boon to farmers, who spend and lose more money on the turnip crop than on any other crop they grow.

THE ESTIMATION OF OIL IN LINSEED-CAKES.

By Dr A. P. AITKEN.

The attention of the Chemical Committee having been drawn to the frequent occurrence of discrepancies in the estimation of oil in the same sample of linseed-cake by different chemists, it was remitted to me to investigate the matter, and devise a method which would give uniform and accurate results, and which should be followed by chemists in analysing samples of cake for analytical associations claiming the Society's grant. Accordingly during the past year the various recognised methods have been subjected to a careful examination, and after many experiments and tests I am able to recommend a method by which accurate results may be obtained, and also to describe some new apparatus which I have devised for carrying out the process with precision and rapidity.

The method of sampling cakes, so as to secure that the samples sent to the analyst is fairly representative of the bulk, is described under the regulations of the Chemical Department of the Society in Appendix B of the 'Transactions' as follows: "Samples of cake should be taken by selecting three cakes, breaking each across the middle, and from the broken part breaking off a segment across the entire breadth of the cake. The three segments thus obtained should be wrapped up and sealed by the samplers, and sent for analysis, as in the case of manures, and three duplicate segments similarly taken, sealed and labelled, should be retained by the purchaser." A sample taken in this manner may not be absolutely representative of the bulk, but at least it secures that the sample sent for analysis and the duplicate retained shall be of similar composition, so that any discrepancies in the analyses of two chemists cannot be ascribed to differences in the samples analysed.

Fine sample.—To prepare a fine sample from this the three or more pieces should be broken into small lumps, and these, after being thoroughly mixed together, should be divided into two parts, one of which should be stored in a well-corked bottle or air-tight case, and the other ground to fine powder in the laboratory mill. A suitable quantity of the fine powder should be immediately put into a well-corked or accurately stoppered bottle to prevent its gaining moisture, which it does very rapidly if not kept completely protected from the air. The fineness of the powder to which the sample is ground is a matter of importance. If too coarsely ground the operations of extracting the moisture and the oil are unduly retarded.

A sample ground finely enough to enable it to pass through No. 20 wire-cloth—that is, a mesh of about one millimeter—will be found very suitable.

Estimation of moisture.—Before extracting the oil the portion of fine sample taken for that purpose must first be dried. It is the practice in some laboratories to extract the oil from the undried sample, and I am of opinion that the majority of the discrepancies in the determination of the oil in linseed-cakes, and still more in other kinds of feeding-stuffs, are due to that cause. At the annual meeting of the German Experimental Stations Association, held at Bonn in 1888, a Committee reported that, in the estimation of oil in the residue of sugar-beet pulp, the apparent amount of oil might vary between 3 and 10 per cent, according as the sample was dried or not before extracting the oil.

The reason is, that when oil is extracted from a damp sample other substances besides oil are extracted along with it.

The method of estimating the moisture in linseed-cake usually followed is to expose one or two grammes of the fine sample in a water-bath or an air-bath at 100° C. until it ceases to lose weight; but it is noticed that when linseed-cake meal is so treated, it begins to gain weight from the oxidation of the oil, and the longer it is exposed in the hot air of the bath, the heavier it becomes. But as it is inevitable that oxidation proceeds from the beginning, the time at which the sample ceases to lose weight does not indicate the period at which the sample has lost all its moisture. It indicates the time at which the loss of moisture and the gain of oxygen counterbalance each other. If the sample is dried at a temperature a few degrees over the boiling-point of water it dries more rapidly, but the oxidation goes on more rapidly also. In most laboratories the error from this imperfect method is minimised, or at least concordant results are endeavoured to be obtained, by exposing one or two grammes of the fine sample in the air of the water-bath for a definite time, say for two hours, reweighing the sample at the end of that time, and regarding the loss of weight as the measure of the moisture. As a rough and ready process this might be accepted for commercial purposes if the same quantity of the fine sample were used for the purpose by all analysts, if it were spread out on a watch-glass or other vessel equally so as to expose always the same amount of surface to the action of the hot air, if the ventilation of the bath were uniform, and if the bath were kept at a uniform temperature all the time and in all cases; but these are all conditions that are variable, and therefore concordant results cannot be obtained in that way.

This difficulty is entirely overcome if the sample is dried in an atmosphere from which oxygen is excluded. An atmos-

phere of hydrogen is excellent, but as that may not be conveniently obtainable, coal-gas makes a very good substitute. It is used in some Continental laboratories, and has been recommended by the Association of Agricultural Chemists in Germany.¹ The apparatus for obtaining a coal-gas atmosphere in which the drying process is conducted is an adaptation of Liebig's duck-tube, as shown in section 1, *a b c*, fig. 1, which

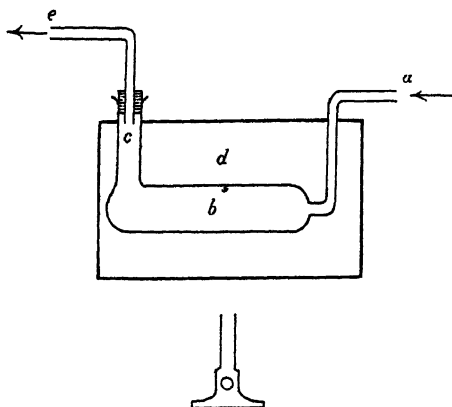


Fig. 1.

shows the arrangement used in Professor Mærcker's laboratory at Hallé.

Ten of these are arranged side by side in series and let into an air-bath *d*; and the temperature of the air in the bath is kept at 105° C. to 107° C. by bunsen burners under the control of a thermostat.

Five grammes of the fine sample is poured into the body of the tube *b* through the upright neck at *c*, and the whole is weighed. It is then put into the bath, the gas is led in at *a* and escapes, and is burned at the mouth of the narrow tube *c*, which is fitted into the neck of the duck-tube with a cork. After the gas has passed for 8-10 hours the sample is dry. Air is drawn through the tube for a few minutes to expel the coal-gas, and the apparatus is again weighed. The difference between the first and second weighings is the moisture. The main objection I have to this apparatus is that the duck-tube is a heavy piece of apparatus, not well adapted for determining moisture in substances containing little of it, therefore a very large amount of the substance has to be dried, and the drying takes a very long time.

A modification of a little drying apparatus that I devised

¹ Versuchs-Stationen, vol. 35.

and have had in use in my laboratory for ten years enables the operation to be carried out with perfect accuracy, with little trouble, and very rapidly. It consists of a small rectangular box 10 inches long, 4 inches deep, and 2 inches wide, placed on edge as shown in fig. 2, and in sections longitudinally and transversely, fig. 3, A.

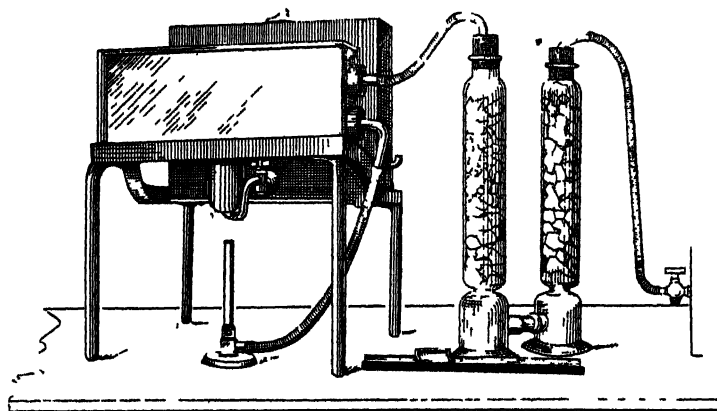


Fig. 2.

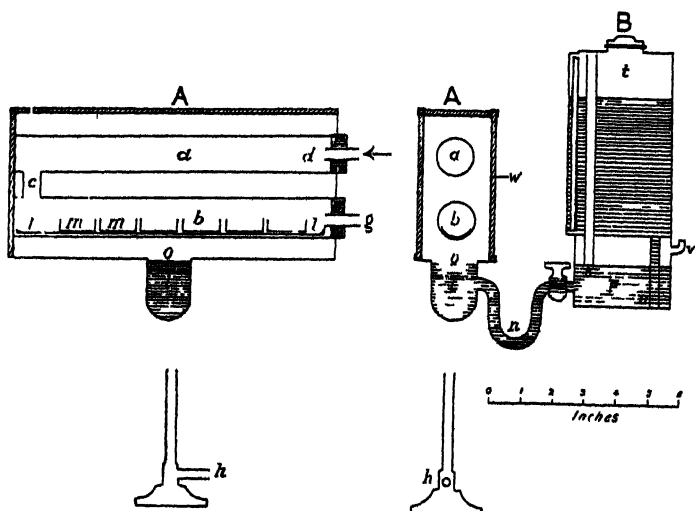


Fig. 3.

Through the box from end to end pass two hollow cylinders made of telescope tubing, and soldered into the box at each end. The box is simply a steam bath to heat the two tubular chambers, which are fitted at one end with the perforated corks *r r*,

and have the other end either closed with corks or entirely soldered up as in the diagram. The upper tubular chamber *a* is for heating the gas, and the lower one *b* for drying the samples, which are contained in little aluminium boats *m m* resting on a carrier of brass *l l* which slides into the chamber. The carrier and one of the boats is shown separately in fig. 2.

These boats, capable of holding one or two grammes cake, weigh only about 1 to 2 grammes each, and are therefore very well adapted for weighing small quantities. The gas from the tap is led first through two drying-bottles, filled, one with soda-lime and one with chloride of calcium, and enters the apparatus by the tube *d* in a perfectly dry state. It passes along the upper chamber *a* where it is heated, and then passes through *c*, which is a tube connecting the upper with the lower chamber. It arrives at the lower chamber *b* both hot and dry and passes along, drying on its way the samples (usually of one gramme each) contained in the little aluminium boats *m m*, eight of which can be accommodated on the carrier. The gas leaves the apparatus by *g*, and may be burned there, but as the flow of gas is sufficient to keep a small bunsen going, I connect the tube *g* with the bunsen *h*.

The flame of this little bunsen keeps the water in the thimble-shaped cup *i* briskly boiling. The water in the thimble (about two ounces) is kept constantly at the level *o* by its connection with the automatic cistern B connected with the bath by the tube *n*, which is bent downwards and up again so as to prevent hot water from passing back into the lower section of the cistern *p*. As soon as the level of the water in this lower section falls below the mouth of the tube *s*, a bubble of air passes up the tube into the upper cistern *t*, and a corresponding quantity of water flows into the lower section through *u*, and restores the level of the water. A small hole *v*, into which an upwards bent tube is fitted, allows air to enter the lower section. The object of the upturned tube is to prevent water from spilling out of the air-hole when the apparatus is carried about. This cistern contains more than a day's supply of water, and gives no trouble, and is supported, along with the bath, on a light iron frame as shown in the diagram. The inside of the bath is thus constantly full of steam, which escapes by a hole at the top about $\frac{1}{8}$ inch diameter. The bath is made of copper, but its entire surface is protected against contact with the surrounding air by means of asbestos sheeting $\frac{1}{8}$ inch thick, *w*.

The temperature in the upper chamber is thus kept constantly at the boiling-point of water, and not several degrees below it as is usually the case in even the best water-baths. By means of this small apparatus eight 1-gramme samples of cake can be dried within two hours. They are removed by drawing

out the carrier, transferred to an exsiccator, and weighed in the aluminium trays, whose weights are known and deducted, thus giving the moisture. The results are perfectly accurate, and the cost in gas is very small—only about one cubic foot per hour.

The samples are now ready to have their oil extracted and estimated.

It is not essential that the last traces of moisture should be removed before the oil is extracted. If the sample is dried for half the time required to completely dry it, it is in a suitable condition for oil extraction. Nine-tenths of the moisture will have gone by that time, and the presence of about 1 per cent of moisture does not appreciably affect the amount of oil extracted.

I prefer to take the sample whose moisture I have estimated, and which is completely dry, because I have a method of extracting oil by which even very small quantities of oil can be accurately estimated, and which possesses the further advantage of being more rapid than any other method that I know of.

Solvent for Oil in Cakes.—Ether, bisulphide of carbon, or benzene, are the solvents usually employed, but as ether is the one which is most common, most rapid, and most comfortable to work with, I prefer it to the others. It is a little more expensive, but as the quantity used in oil determinations is small, the additional cost is more than compensated by the advantages mentioned. Ordinary pure ether, as supplied by wholesale chemists, having a specific gravity of .73, is sufficiently pure and dry for the purpose of oil extraction; but as most of the ether used is recovered by redistillation in the laboratory and may contain water, it must be dried before being again used. This is sufficiently accomplished by shaking it up with chloride of calcium repeatedly for some days, and redistilling.

Determination of Oil.—The oil may be determined either by directly weighing the oil extracted, or by weighing the dried substance before and after the oil is extracted, and determining the oil by the difference of the two weighings. There are two objections to the former method. In the first place, the flask in which the oil is caught is itself very heavy, and presents too great a surface; and in the second place, the evaporation of the residual ether in the drying chamber takes a long time, and the surface of the oil becomes covered with a thin pellicle, due to oxidation. The latter method is much to be preferred if a suitable apparatus can be had for doing the work simply and rapidly. The apparatus I have devised for that purpose is very simple, and is shown on fig. 4. It consists of a set of brass tubes, polished smooth inside, see fig. 4, A, which is half the actual size, and is represented as charged with the dried sample. In

charging the tube, the first thing required is to drop into it a small disc of wire gauze *x*, and then to insert a single or double wad of filter-paper *w*, which is cut to fit the tube tightly, and pushed home with a ramrod. (I use a cork-borer of the proper size for cutting the wads, and a piece of glass rod flattened out at the end while hot as a ramrod.) The object of the wire gauze disc is to facilitate the flow of the ether through very fine powders, such as ground grain, and also to enable the sample to be removed from the tube more easily after the oil is ex-

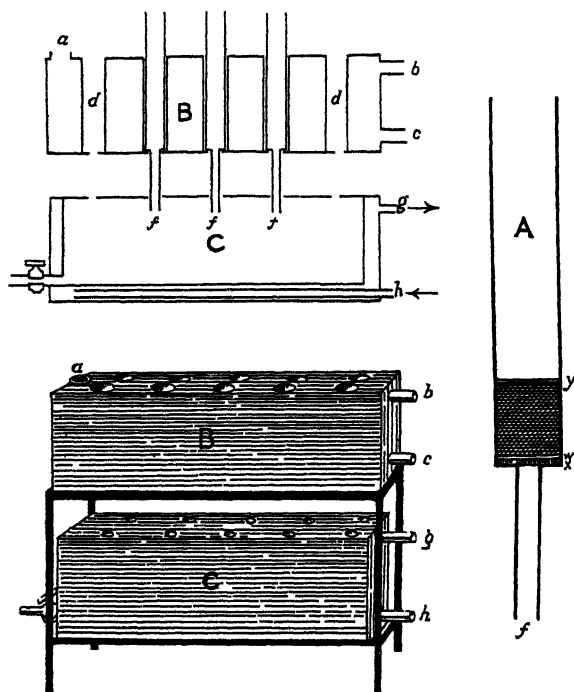


Fig. 4.

tracted. The sample is then poured in through a little metal funnel, whose neck just fits the extraction tube. Any powder adhering to the funnel is brushed in with a camel-hair brush, then another wad *y* is patted in on the top of the sample, carrying with it any powder that might have adhered to the side of the tube, and leaving the upper part of the tube clean and bright. The tube is now put into one of the holes in box B, which is simply a warming box made of zinc, shown also in section.

The holes *d d*, &c., are tubes which pass through the box

from top to bottom, and are made a shade wider than the extraction tubes, which should drop in easily. As soon as the extraction tubes are filled they are dropped into these tubular openings, which are provided with a ledge at the base to sustain the extraction tube.

Hot water is poured into the box at *a*, or a constant current of hot water may be made to flow through the box, entering at *b* and flowing out at *c*, by attaching these by means of tubes to a copper coil under which a bunsen is burning at a safe distance. At first I used the circulation method, but now I prefer to have no gas burning anywhere near the extractor. It is quite convenient to supply hot water at *a*, and withdraw the cooled water at *c* from time to time. As soon as the extractor tubes are dropped into their places, ether is poured into them to within an inch of the top, and by the time that the five tubes are thus filled the ether will be boiling in the first tube. A cork is now firmly fixed into each tube in succession, thus preventing the ether-vapour from escaping, and the pressure of the confined vapour forces the boiling ether down through the samples and out through the lower openings *f* into little bottles placed beneath, so that the oil may be collected from each tube separately. If the oil of each sample is not to be kept separate, the mouths of the extractor tubes are made to dip into a zinc box *C* beneath, through small holes on the top, and there the oily ether collects and is run off from time to time, and redistilled for future use. There is considerable loss of ether by this method, but that is much reduced as one becomes expert at handling the apparatus; and if the ether box below is provided with double walls between which a current of cold water is kept flowing through the openings *g h*, the loss from evaporation is still further reduced.

This process of filling the tubes with ether is repeated ten, fifteen, or even twenty times, according to the difficulty of extracting the oil. The operation is complete when a drop or two of ether, falling from the exit *f* towards the end of an extraction, is caught on a clean watch-glass and evaporated without leaving any residue. The extractor I use in my laboratory is fitted for ten tubes, and after a little practice the oil from ten samples of cake can be extracted with it in one hour. The extraction of oil from a sample, by means of Soxhlet's apparatus, which is the one chiefly used at present, takes about five hours, so that this little apparatus has a great advantage over it as regards speed; but, many comparative tests have proved that it also has the merit of making a more thorough extraction of oil. This is due to the fact that the extraction is made with boiling ether, and that no oily ether that has once been washed through is able to run back upon the sample again,

as is the case with Soxhlet's apparatus. In extracting the oil from some substances, such as grain or other starchy powders, the resistance to the passage of ether is so great that even a tightly-fitting cork is apt to be blown out by the pressure of the vapour. In such cases I use caps with a cork washer inside, which fit on to the top of the tubes with a screw or with a bayonet-grip, which is more rapidly adjusted.

When the oil has been completely extracted, the removal of the sample is a neat and easy operation. It is done by inserting the cut end of the glass ramrod into the opening *f* and slowly pushing out the sample (wads and all) into a weighed aluminium capsule. The wads are now removed, after scraping off any particles of powder adhering to them with a brush, and the dry powder, after exposure for a short time to a temperature of 100° C., is cooled in an exsiccator and weighed. The difference between that and the former weighing is the weight of the oil extracted.

It is evident that the accuracy of the oil determination by this method depends upon the accuracy of the determination of moisture; but as by the method above described the moisture can be accurately determined, there is no danger, if that method is adopted, of making any error in the estimation of the oil. It is shown by experiments described below, that in estimating moisture in the ordinary way it is considerably under-estimated, usually to the extent of one-twentieth or more, and in such circumstances that which is under-estimated in the moisture is usually added on to the oil; for the common practice is to determine the percentage of moisture in one part of the sample, the percentage of moisture and oil together in another, and to subtract the former from the latter, so as to give the percentage of the oil.

The extent to which the estimate of the oil in an ordinary sample of linseed-cake may vary according as it is extracted from the dried or undried sample, and according as wet or dry ether is used for the purpose, is shown by a few experiments whose details are given in the Appendix.

It is seen that, even with ordinary samples of linseed-cake of what may be called normal composition, the percentage of oil may vary between very wide limits—in one case between 9.67 and 12.05 per cent, according as the sample and the ether are dried or not, and according to the method by which the moisture was determined.

From the results of this investigation I am led to make the following recommendations, which, if adopted, will ensure the obtaining of accurate and uniform results in the determination of oil in linseed-cakes:—

1. The sample of cake, or a carefully selected portion of it,

should be ground so finely as to enable it to pass entirely through a sieve of No. 20 wire-cloth, and the fine sample so obtained should be kept in a tightly stoppered bottle.

2. The moisture should be determined by weighing out 1 or 2 grammes of the fine sample and drying it in a current of dry coal-gas at 100° C. until it ceases to lose weight.

3. The oil should be extracted from the dried residue by means of dry ether.

4. The residue, after extracting the oil, should be heated to 100° C., removed to an exsiccator and weighed. The percentage of oil is determined from the difference between the second and third weighings.

APPENDIX.

MOISTURE DETERMINATION.

To determine the amount of error due to oxidation in the process of drying, three samples of home-made linseed-cake (A), 1 gramme each, were taken. The first was dried in the air-bath at 100° C. After remaining in the bath for 2 hours it ceased to lose weight. The weight lost was 11.80 per cent.

The second was dried in the air-bath at 110° C. It ceased losing weight after 1½ hour. The weight lost was 12.20 per cent.

The third sample, dried in a current of coal-gas at 100° C. at the rate of 1 cubic foot per hour, ceased losing weight in 1½ hour. The weight lost was 12.60 per cent.

A sample of another linseed-cake (B), dried in the air-bath at 100° C., ceased losing weight after 2 hours, and lost 11.15 per cent.

A second sample of (B), dried in a current of dry coal-gas at 100° C., at the rate of 1 cubic foot per hour, ceased losing weight in 1½ hour, and lost 11.95 per cent.

A sample of another linseed-cake (C), dried in the air-bath at 100° C., ceased losing weight after 2 hours, and lost 11.30 per cent.

A second sample of cake (C), dried at 100° C. in a current of dry coal-gas, at the rate of 1 cubic foot per hour, ceased losing weight in 1½ hour, and lost 11.95 per cent.

In all three cases, A, B, and C, the amount of water by drying in air was under-estimated owing to oxidation during drying. Taking the loss of weight by drying in a current of coal-gas as representing the true moisture, the amounts of moisture accounted for by the ordinary method of drying for 2 hours in a water-bath were :—

A	.	.	.	.	93.6	per cent of total moisture.
B	.	.	.	.	95.3	" "
C	.	.	.	.	93.3	" "

When samples are dried in the water-bath for a longer period than 2 hours, the deficiency in the estimation of moisture is still greater.

OIL DETERMINATION.

Results obtained by extracting the oil from 1-gramme samples of ground linseed-cake. 1st, before drying; 2d, after drying in the air-bath at 100°

for 2 hours; 3d, after drying in current of coal-gas for $1\frac{1}{2}$ hour, both with wet and dry ether.

For these experiments samples of the linseed-cakes A, B, and C were taken.

In the first column are given the percentages of oil and water combined, in the second column the percentages of water, and in the third column the difference between the two representing the percentages of oil.

SAMPLE A.

Undried—	Moisture and oil.	Moisture.	Oil.
Wet ether	23.20	11.80	11.40
Dry ether	23.80	11.80	12.00
Dried in air-bath—			
Wet ether	23.75	11.80	11.95
Dry ether	23.27	11.80	11.47
Dried in coal-gas—			
Dry ether	23.55	12.60	10.95

SAMPLE B.

Undried—			
Wet ether	23.45	11.30	12.15
Dry ether	24.30	11.30	13.00
Dried in air-bath—			
Wet ether	24.20	11.30	12.90
Dry ether	22.90	11.30	11.60
Dried in coal-gas—			
Dry ether	23.00	11.85	11.15

SAMPLE C.

Undried—			
Wet ether	22.80	11.15	11.65
Dry ether	23.20	11.15	12.05
Dried in air-bath—			
Wet ether	22.70	11.15	11.55
Dry ether	21.60	11.15	10.45
Dried in coal-gas—			
Dry ether	21.62	11.95	9.67

In the case of the samples extracted when undried and when dried in the air-bath, the moisture given is that found by drying in the air-bath for two hours, as is usual. In the case of the samples extracted after drying in coal-gas, the moisture given is that found by drying in coal-gas.

FEEDING EXPERIMENT

TO DETERMINE THE KIND OF BY-FODDER MOST SUITABLE FOR CATTLE FEEDING ON A MIXTURE OF GREEN TARES AND OATS.

By Dr A. P. AITKEN and Mr JOHN MILNE.

It is the custom in Aberdeenshire, when cattle are being fed on green tares, to give them a few pounds per day of linseed-cake in addition. But in fact it does not seem to matter what kind of rough fodder cattle are eating, whether it be straw, or hay, or turnips, or mixtures of these; if the feeder wants to see the cattle making better progress, he almost invariably has recourse to linseed-cake as a supplementary fodder. Some may prefer cotton-cake or perhaps rape-cake, but in nine cases out of ten it is a cake of some kind the general character of which is that it is rich in albuminoid matters and also in oil. That is a practice which must seem very irrational to any one who has been taught to believe that in a properly constituted dietary there is one proportion of albuminoids to non-albuminoids, or "nutrient ratio" as it is called, that is more suitable than others. What that proportion is, is said to depend on a variety of circumstances,—the age of the cattle, their state of forwardness, their previous feeding, and a variety of other refinements which need not be here enumerated. But we find that in Aberdeenshire, where men succeed in feeding cattle quite as well as in any other part of the world, they do not trouble themselves about these matters. It does not seem to matter to them whether an animal is feeding on straw, which is poor in albuminoids, or on tares, which are rich in albuminoids; if they want the animal to put on flesh more rapidly, they supplement its fodder with linseed-cake. It seemed to me that as there was an apparent contradiction between theory and practice in this matter, it was desirable to have it put to the test of experiment, and I consulted Mr John Milne on the subject. He thought the question was of sufficient importance to warrant undertaking an experiment involving a good deal of trouble and expense, and with his usual zeal he undertook to try it at Mains of Laithers, where he had a field sown with a mixture of tares and oats suitable for the purpose. I went to Mains of Laithers and arranged with him the details of the experiment, the general plan of which was to have three lots of cattle, one to be fed with the green tares alone, another to receive in addition 4 lb. each of linseed-cake, and the third to receive instead of linseed-cake, which was rich in albumen, a mixture poor in

albumen but rich in carbohydrates—viz., 2 lb. maize-meal, 1 lb. locust-bean meal, and 1 lb. ground linseed. That seemed a much more appropriate by-fodder to give along with tares, which is a fodder theoretically too rich in albumen, and requiring dilution rather than concentration in that respect. It was evident, however, that something more was wanted than merely to feed the three lots as described, and test the success of the fodders by the progress of the cattle as indicated by their weekly weighings.

In order to have full control over the whole progress of the experiment, and avoid the risk of losing the true meaning of it, we deemed it expedient to have one of each of the three lots under conditions which enabled us to know the quantity and also the quality of the dung and urine voided. The stall fitted up for that purpose at Mains of Laithers two years before had served its purpose very well during two seasons, and we resolved to have other two stalls of almost the same pattern, the essential part of which is a sparred floor, underneath which are slid two zinc trays, one in front to catch the urine, and one behind to catch the dung. The only drawback to the use of such stalls is that the animal requires to be pretty closely tied up, so as to prevent the liquid and solid excrements from mixing, and has not, therefore, the same amount of comfort as in the comparative freedom of an ordinary stall.

Nine oxen, Irish steers, two-and-half-year-old, were all that could be spared for the experiment, and as they seemed a pretty level lot, I was glad to have the experiment tried with that small number rather than have no experiment at all. As was expected, the three steers in the sparred stalls did not make quite so much progress as those in the double stalls, and therefore, in so far as thriving is concerned, the three pairs give a more reliable test than the three single steers; moreover, one of the three latter turned out to be rather a poor feeder, and another an exceptionally good one. Like man, some cattle relish and thrive on one kind of food, others prefer another kind. Some thrive best outside, others do best stall-fed. Experience shows that to minimise anomalies caused by these individual peculiarities, a considerable number of cattle should be in each experimental lot; but this of course limits the number of feeding experiments that can be practically carried out.

The experiment lasted six weeks. Full details of the fodder and water consumed daily by all the cattle, and of the dung and urine voided by those in the sparred stalls, are given on pages 348-352, at the end of this paper, and will repay the trouble of careful examination.

It is unnecessary here to do more than give a short summary of the results obtained.

The green fodder (tares and oats) was analysed at the end of the second, and again at the end of the fourth week, and had the following composition:—

	2d week.	4th week.
Moisture	84.70	72.40
Dry matter	15.30	27.60
	<hr/>	<hr/>
	100.00	100.00
The dry matter consisted of—		
Albumen	12.25	8.06
Amides, &c. ($N \times 6.25$)	6.66	1.78
Oil (ether extract)	3.30	3.90
Carbohydrates, &c. . . .	43.29	52.16
Woody fibre	26.50	28.50
Ash	8.00	5.60
	<hr/>	<hr/>
	100.00	100.00

These analyses show that the composition of the green fodder was changing very rapidly as the season advanced. It became much less succulent, and from being a very nitrogenous fodder, with a nutrient ratio of about 1 to 4, it fell away to one with a ratio of about 1 to 8.

Towards the end of the experiment the crop became ripe. The addition of the mixed by-fodder to the dietary of lot I. gave the entire fodder a ratio of about 1 to 5 at the end of the second week, while the addition of linseed-cake to the dietary of lot II. gave the entire fodder at that period a ratio of about 1 to 3½.

It is therefore seen that during the first half of the experiment lot I. were feeding on a diet having a relatively wide nutrient ratio, lot II. on a diet with a very narrow one, and lot III. on a diet which was intermediate.

The generally received theory, founded upon experiments carried out for the most part in Germany, is that a nutrient ratio of about 1 to 5½ or 1 to 6 is most appropriate for the dietary of fattening cattle of the kind under experiment.

If we were to take as our guide the nutrient ratio alone, we should expect that during the first half of the time at least lot I. would make best progress, or would make best use of their food; that lot III. would come next; and that lot II., while they might progress as well as the others, would do so at the cost of a considerable waste of food constituents.

During the latter half of the time, when the tares and oats were becoming more woody and the proportion of albumen to non-albuminoid constituents in the fodder becoming smaller, the fodder of lot II. would have a nutrient ratio of about 1 to 7, lot III. about 1 to 8, and lot I. about 1 to 8½. These ratios are all wider than the normal; but lot II., with the narrowest

ratio, ought then to have made most progress, and lot I. ought to have fallen away to some extent.

The results as shown on Tables III., IV., and V. disappointed most of these expectations.

The state of progress of the three lots will be seen at a glance on Table I., p. 343, which is a summary of the weekly weighings.

It is apparent that lot II. took the lead all the time. It was unfortunate that bullock (*a*) of lot I. went off his feed for three days, but it seems probable that he made up the loss during the following fortnight.

The average amount of fodder consumed daily, the amount of dry matter it contained, and the daily increase in live weight, were as follows:—

	Tares.	By-fodder.	Straw.	Total solids.	Live-weight increase.
	lb.	lb.	lb.	lb.	lb.
Lot I.—					
Mixture . .	102	4	1 $\frac{3}{4}$	25.3	3.6
Lot II.—					
Linseed-cake .	111 $\frac{1}{2}$	4	1 $\frac{3}{4}$	27.3	3.9
Lot III.—					
No by-fodder .	99 $\frac{1}{8}$	0	2 $\frac{1}{2}$	22.1	3.0

Lots I. and II., in addition to their 4 lb. daily of by-fodder, consumed almost exactly the same amount of straw—viz., 1 $\frac{3}{4}$ lb. daily; but it is important to notice that lot II. consumed 9 $\frac{1}{2}$ lb. more tares daily, and it seems obvious that it is to that circumstance that we must attribute their better progress.

It would be natural to expect that lot III., which got no by-fodder, would make up for that by consuming a larger amount of tares than the other two lots; but, on the contrary, they consumed least of all.

How is this curious result to be explained? If we start with the assumption that all these lots were equally good feeders, it would seem as if those eating linseed-cake had a better appetite, and we might be inclined to give the linseed-cake the credit of causing that increase of appetite; but it is manifestly unsafe to draw such a conclusion from an experiment in which each lot contained only two animals. Fortunately the further experiment with three oxen, each feeding singly in the control stalls, prevents our jumping at such a rash conclusion. In the case of these three oxen it will be seen from Table VI., p. 351, that the position is entirely reversed. The one getting no by-fodder ate most tares, and the one eating linseed-cake ate least tares.

It is evident that the two oxen of lot III. were not quite so good feeders, and it does not seem that the one who was master had oppressed the other, for both made nearly equal progress

TABLE I.—WEEKLY RECORD OF THREE PAIRS OF CATTLE FED ON GREEN TARES AND OATS, WITH AND WITHOUT BY-FODDER, AT MAINS OF LAITILERS, 1892.

LOT. I.—*By-fodder* = A mixture of *Muir-mead*, *Locust-bean Meal*, and *Linseed-mead*.

Week ending	Tares.	Mixture.	Straw.	Water.	Live-weight Increase.
	lb.	lb.	lb.	lb.	lb.
Aug. 11	1520	56	18	...	107
" 18	1496½	56	24½	...	7 } 188
" 25	1499	56	32½	55	74 } 113
Sept. 1	1232	54½	25	...	10 } (a) off feed.
" 8	1498	56	39	26	30 } 113
" 15	1325	56	8½	90	73 }
Total, 42 days.	8570½	334½	147½	...	301
Daily average.	102	4	1½	...	3.6
Average daily } dry matter }	20.4	3.4	1.5 = (25.3 lb.)		

LOT II.—*By-fodder* = *Linseed-cake*.

		Cake.			
		lb.			
Aug. 11	1566½	56	20½	...	110
" 18	1614½	56	21½	...	23 } 208
" 25	1562½	56	35½	123½	75 }
Sept. 1	1634	56	21½	...	44 }
" 8	1584	56	32½	...	33 } 117
" 15	1410½	56	11½	162	40 }
Total, 42 days.	9372½	336	143½	...	325
Daily average.	111½	4	1½	...	3.9
Average daily } dry matter }	22.3	3.5	1.5 = (27.3 lb.)		

LOT III.—*No By-fodder*.

Aug. 11	1362½	...	27	10	73
" 18	1453½	...	28½	50½	44 } 167
" 25	1424½	...	50	...	50 }
Sept. 1	1504½	...	30½	25	8 }
" 8	1332	...	45	...	46 } 81
" 15	1261½	...	28½	116	27 }
Total, 42 days.	8339	...	209½	...	248
Daily average.	99	...	2½	...	3.0
Average daily } dry matter }	20	...	2.1 = (22.1 lb.)		

—viz., (a) 112 lb. and (b) 136 lb. during the forty-two days over which the experiment lasted.

The daily increase in live weight was very satisfactory, and it is interesting to notice that the live-weight increase of all the lots was almost exactly in proportion to the amount of dry matter consumed.

There was a considerable falling off in the amount of tares eaten daily during the last fortnight, when the crop was ripening, drying up, and becoming more woody, and the want of by-fodder in the daily ration of lot III. put them then at a great disadvantage.

The control oxen tied up in the prepared stalls lost weight during the last week, and indeed it would appear that they were not in comfortable enough circumstances to thrive. They evidently became wearied of their prolonged confinement; and after the first three weeks, ox II. gained weight at the rate of only about $1\frac{1}{2}$ lb. daily, ox III. gained considerably less than a pound daily, and ox I. made no progress at all. They would doubtless have thriven better in ordinary stalls, so that it would manifestly be a mistake to attribute the progress made by them entirely to the kind of fodder they were consuming. The exceptional conditions under which they were kept affected them differently according to their temperament. Ox I. seems to have fretted under its confinement more than the others, and both it and ox II. ate less tares than the corresponding oxen in the ordinary stalls.

It is curious to note, however, that ox III. ate more tares than the two corresponding oxen in the ordinary stall, and consumed the normal amount of dry matter in its daily fodder.

It would evidently be unfair to take the last three weeks' record of the three control oxen as an indication of the feeding quality of the fodder they consumed, but the first three weeks' record ought to be regarded as available for that purpose.

The average daily record of the three control oxen during the first three weeks was as follows:—

	Tares.	By-fodder.	Straw.	Total solids.	Live-weight increase.
Ox I.—	lb.	lb.	lb.	lb.	lb.
Mixture . .	103 $\frac{1}{2}$	4	2 $\frac{1}{2}$	25.2	3 $\frac{1}{2}$
Ox II.—					
Linseed-cake .	95	4	2 $\frac{1}{2}$	24	3 $\frac{1}{2}$
Ox III.—					
No by-fodder .	118	0	2 $\frac{1}{2}$	25.6	4 $\frac{1}{2}$

This record is of considerable value, inasmuch as it shows how unsafe it is to draw general conclusions from the progress made by single animals when fed in different ways for the purpose of testing the relative value of different fodders, and that more especially when the duration of the experiment is limited to

three weeks. Nevertheless a very large number of the experiments that have been used to test questions in feeding have been somewhat of that kind, and a carefully carried out experiment like the above will serve a useful purpose if it warns those who may be apt to pin their faith too absolutely on the principle of nutrient ratios, as described in elaborate tables for all kinds of fodder, that there are other circumstances that are of even greater importance for success in feeding.

The example before us shows that the progress of cattle depends much more upon their feeding capacity than upon any fine distinctions as regards the nutrient ratio of the fodder they are consuming. It is evidently of far greater importance that a feeder should select his cattle from a knowledge of their thriving tendency than that he should select his fodders so as to produce nutrient ratios of 1 to 4, 5, 6, or 7, as the case may be.

If the cattle are bred or selected on that principle in the first instance, and if the rough fodder they are caused to consume is what experience has shown to be an appropriate one, what is chiefly wanted is that the cattle shall eat enough of it daily to ensure their rapid progress. If they fail to do that, the addition of an appetising by-fodder enables that end to be attained.

In this experiment the two kinds of by-fodder were of a widely different character. The mixture of maize-meal, locust-bean meal, and linseed-meal had a nutrient ratio of about 1 to 9, the linseed-cake had a nutrient ratio of about 1 to 2, and there was very little difference in the results attained when lots I. and II. had four pounds per head given them daily. It seems probable that if lot I. had eaten as much tares as lot II. there would have been no difference in the relative progress of the two lots, despite the difference in the nutrient ratios of their by-fodder. It is evident that one must not consider too narrowly or too anxiously the nutrient ratio of the fodder, but rather try to get the animals to eat a larger quantity of it. The great mass of the fodder eaten is required for simple maintenance. It is what is eaten over and above that, that goes to fattening; and even a few pounds more eaten daily, although it bears a small proportion to the weight of total fodder consumed, has a marked effect upon fattening. But whether the dry matter of that extra fodder should have a wide, a narrow, or a middling ratio, the experiment before us does not tell with any distinctness. The linseed-cake seems, on the whole, to be most reliable, and if it is dearer the extra cost is compensated to some extent in the greater manurial value of the urine. On page 352 are given weekly analyses of the dung and urine of

the three oxen in the control stalls, which yield some very interesting information.

The averages are shown in the last column, but seeing that the three oxen made practically no progress during the latter half of the time, it would be better to confine our attention to the results of the first three weeks' feeding.

These may be conveniently summarised as follows:—

TABLE II.
AVERAGE ANALYSES OF DUNG AND URINE OF OX I., II., AND III.

Dung.	Ox I.	Ox II.	Ox III.
	per cent.	per cent.	per cent.
Water	86.12	85.12	88.16
Solids	13.88	14.88	11.84
	100.00	100.00	100.00
Solids contained—			
Albumen	11.30	11.63	10.50
Amides, &c.	2.31	1.52	1.60
Oil, &c.	4.47	4.33	4.27
Carbohydrates, &c.	44.41	45.18	45.50
Woody fibre	26.78	23.91	25.87
Ash	10.73	13.43	12.26
	100.00	100.00	100.00
Nitrogen	2.17	2.10	1.90
	lb.	lb.	lb.
Total solids (21 days)	112.3	111.6	108.2
Containing nitrogen	2.43	2.34	2.05
Urine contained—	per cent.	per cent.	per cent.
Nitrogen . . . . .	.92	1.34	.83
	lb.	lb.	lb.
Total urine	590	426	726
Nitrogen in urine	5.43	5.71	6.02
Total nitrogen in dung and urine	7.86	8.05	8.07

The chief interest in these figures attaches to the nitrogen. Despite the fact that ox II. was feeding on a more nitrogenous diet than the others, there is even less nitrogen in its solid excrement, and it must therefore be parting with more in its urine, or laying up more in its tissues as flesh. Its urine is seen to be much more nitrogenous than the urine of the other two, but the quantity voided during the three weeks—viz., 426

lb.—was so much less than that of the others that the total amount of nitrogen lost in its urine was very little more than that lost by ox I., and rather less than that lost by ox III. If we add together the nitrogen of the dung and urine, we find, as shown in the lowest line of the table, that the nitrogen loss of ox II. and ox III. is practically equal, and only a little greater than that of ox I.

We may therefore infer that ox II. was putting on more flesh than the other two, that ox I. was probably laying on a little more fat, but that the live-weight increase of ox III. was due in greater measure to water added to its tissues; and had the three oxen been killed, it would have been found that ox II. contained a larger proportion of carcass than ox III., and probably a somewhat larger proportion than ox I., although the difference between ox I. and ox II. in that respect would be very slight.

The result of this experiment, in so far as it is possible to draw any conclusion from a feeding experiment in which so few animals were under observation, seems to be that the practice of giving linseed-cake as by-fodder to cattle consuming tares is justified by the results, but that other nutritious by-fodder of a less nitrogenous kind might be given with equal feeding effect. But as linseed-cake is known to have other advantages besides that of merely increasing the weight of feeding cattle, and especially the property of giving sleekness of skin and bloom to fattening cattle, the probability is that no such mixture as was used in this experiment, even though it were somewhat cheaper, would be any improvement on the present practice.

[TABLE

TABLE III.—LOT I. CONSUMING TARES AND OATS, ALONG WITH MAIZE-MEAL, LOCUST-BEAN MEAL AND LINSEED-MEAL. TWO IRISH OXEN IN ONE STALL.

Date 1892	Tares	Mixture.	Straw	Water	Live-weight	Increase
Aug	lb.	lb	lb	lb	cwt qr lb	
5	232	8	..	...	a. 10 0 23	
6	223 $\frac{1}{2}$	8	..	...	b. 9 2 15	
7	205	8	4	..		
8	212	8	3	...	19 3 10	
9	250 $\frac{1}{2}$	8	2	...		
10	247	8	6	...		
11	150	8	3	...	a. 10 2 9	
12	238	8	3	...	b. 10 0 24	
13	209 $\frac{1}{2}$	8	2 $\frac{1}{2}$...		
14	216 $\frac{1}{2}$	8	6	...	20 3 5	
15	198 $\frac{1}{2}$	8	5 $\frac{1}{2}$...		
16	236	8	...	...
17	211	8	...	...
18	187	8	7 $\frac{1}{2}$	...	a. 10 1 26	
19	186 $\frac{1}{2}$	8	1 $\frac{1}{2}$	...	b. 10 1 14	
20	209 $\frac{1}{2}$	8	3	5		
21	213	8	8	8 $\frac{1}{2}$	20 3 12	
22	228	8	5	...		
23	228	8	4	28 $\frac{1}{2}$		
24	201	8	6	...		
25	233	8	4 $\frac{3}{4}$	13	a. 10 3 16	
26	205 $\frac{1}{2}$	7	2 $\frac{1}{2}$	...	b. 10 2 14	
27	103 $\frac{3}{4}$	7 $\frac{1}{2}$	..	...
28	120	8	...	...	21 2 2	} a. Off his feed.
29	135	8	9	...		
30	214 $\frac{1}{2}$	8	3	...		
31	227	8	3 $\frac{3}{4}$...		
Sept.						
1	226 $\frac{1}{2}$	8	6 $\frac{1}{2}$	...	a. 10 3 12	
2	203 $\frac{1}{2}$	8	7	...	b. 10 3 0	
3	226	8	6 $\frac{1}{2}$...		
4	230	8	7	...	21 2 12	
5	213	8	6 $\frac{1}{2}$...		
6	227 $\frac{1}{2}$	8	2	...		
7	208	8	2	..		
8	191	8	8	26	a. 11 0 0	
9	212	8	4 $\frac{1}{2}$	...	b. 10 3 14	
10	205	8	4	...		
11	197	8	...	...	21 3 14	
12	161	8	...	14		
13	150	8	...	54		
14	203	8	...	...	a. 11 1 5	cwt. qr lb
15	197	8	...	22	b. 11 0 26	1 2 11
					22 2 3	1 0 10
						2 2 21

TABLE IV.—LOT II. CONSUMING TARES AND OATS ALONG WITH
LINSSEED-CAKE. TWO IRISH OXEN IN ONE STALL.

Date. 1892.	Tares.	Cake.	Straw.	Water.	Live-weight.	Increase.
Aug.	lb.	lb.	lb.	lb.	cwt. qr. lb.	
5	230	8	...	...	a. 9 2 14	
6	231 $\frac{1}{2}$	8	...	...	b. 10 1 7	
7	207	8	4	...		
8	223 $\frac{1}{2}$	8	5	...	19 3 21	
9	258	8	...	...
10	246	8	7	...		
11	170	8	4 $\frac{1}{2}$	...	a. 10 0 10	
12	242	8	3 $\frac{1}{2}$	...	b. 10 3 9	
13	213 $\frac{1}{2}$	8	2 $\frac{1}{2}$...		
14	225 $\frac{1}{2}$	8	3 $\frac{1}{2}$	...	20 3 19	
15	212	8	6 $\frac{1}{2}$...		
16	244	8	...	...
17	254	8	...	...
18	223	8	5 $\frac{1}{2}$	...	a. 10 0 14	
19	201	8	2	...	b. 11 0 0	
20	225	8	4 $\frac{1}{2}$	31 $\frac{1}{2}$		
21	234	8	7	27	21 0 14	
22	231	8	5	...		
23	230	8	7	28		
24	205	8	10	37		
25	236	8	...	...	a. 10 1 24	
26	238	8	2 $\frac{1}{2}$	...	b. 11 1 9	
27	214	8	...	...
28	240	8	...	...	21 3 5	
29	223 $\frac{1}{2}$	8	7	...		
30	232	8	2 $\frac{1}{2}$...		
31	234	8	4 $\frac{1}{2}$...		
Sept.						
1	252 $\frac{1}{2}$	8	5	...	a. 10 2 7	
2	228 $\frac{1}{2}$	8	7	...	b. 11 2 14	
3	232	8	6	...		
4	245	8	4	...	22 0 21	
5	217 $\frac{1}{2}$	8	3	...		
6	231 $\frac{1}{2}$	8	1 $\frac{3}{4}$...		
7	224 $\frac{1}{2}$	8	3 $\frac{1}{2}$...		
8	205 $\frac{1}{2}$	8	7 $\frac{1}{2}$	...	a. 10 2 16	
9	238 $\frac{1}{2}$	8	5 $\frac{1}{2}$	...	b. 11 3 10	
10	227	8	1 $\frac{1}{4}$...		
11	193	8	...	43	22 1 26	
12	165 $\frac{1}{2}$	8	...	26		
13	159 $\frac{1}{2}$	8	4 $\frac{1}{2}$	31 $\frac{1}{2}$		
14	226	8	...	31 $\frac{1}{2}$		
15	201	8	...	30		
					a. 10 3 0	cwt. qr. lb.
					b. 12 0 10	1 0 14
						1 3 3
					22 3 10	2 3 17

TABLE V.—LOT III. CONSUMING TARES AND OATS, WITHOUT MEALS OR CAKE. TWO IRISH OXEN IN ONE STALL.

Date. 1892.	Tares.	Straw.	Water.	Live-weight.	Increase.
Aug.	lb.	lb.	lb.	cwt. qr. lb.	
5	213	...	...	a. 9 2 21	
6	193	3	...	b. 10 2 4	
7	198 $\frac{1}{2}$	5	...		
8	174 $\frac{1}{2}$	...	...	20 0 25	
9	225	6	...		
10	234	7	...		
11	124	6	10	a. 10 0 0	
12	238	5	...	b. 10 3 14	
13	208	4 $\frac{1}{2}$...		
14	219	6 $\frac{1}{2}$	...	20 3 14	
15	165 $\frac{1}{2}$	6	...		
16	223 $\frac{1}{2}$	...	38		
17	221 $\frac{1}{2}$	...	12 $\frac{1}{2}$		
18	177 $\frac{1}{2}$	6	...	a. 10 0 14	
19	180	7	...	b. 11 0 16	
20	209	5 $\frac{1}{2}$...		
21	201	6 $\frac{1}{2}$	...	21 1 2	
22	201	7	...		
23	212 $\frac{1}{2}$	10	...		
24	195	9	...		
25	226	5	...	a. 10 1 14	
26	220 $\frac{1}{2}$	2	...	b. 11 1 10	
27	193 $\frac{1}{2}$	...	25		
28	213 $\frac{1}{2}$	...	...	21 2 24	
29	225 $\frac{1}{2}$	10	...		
30	216	3 $\frac{1}{2}$...		
31	209	8	...		
Sept.					
1	226 $\frac{1}{2}$	7	...	a. 10 1 14	
2	198 $\frac{1}{2}$	9 $\frac{1}{2}$	...	b. 11 1 18	
3	181 $\frac{1}{2}$	6 $\frac{1}{2}$...		
4	205	6	...	21 3 4	
5	193	7	...		
6	199	1	...		
7	185	5	...		
8	170	10	...	a. 10 2 15	
9	183 $\frac{1}{2}$	9 $\frac{1}{2}$	...	b. 11 2 7	
10	209	9	...		
11	185	3	45	22 0 22	
12	155 $\frac{1}{2}$	1	...		
13	162	...	39		cwt. qr. lb.
14	186 $\frac{1}{2}$	4	5	a. 10 2 21	1 0 0
15	180	2	27	b. 11 3 0	1 0 24
				22 1 21	2 0 24

TABLE VI.—WEEKLY RECORD OF THREE OXEN FED IN CONTROL STALLS ON GREEN TARES AND OATS WITH AND WITHOUT BY-FODDER, AT MAINS OF LATHIERS, 1892.

CONTROL OX I.

By-fodder—A Mixture of Maize-meal, Locust-bean Meal, and Linseed-meal.

Week ending	Tares.	Mixture.	Straw.	Water.	Dung	Urine.	In-crease
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Aug. 11 . . .	707 $\frac{1}{2}$	28	10 $\frac{1}{2}$	...	217	279 $\frac{1}{2}$	49
" 18 . . .	752 $\frac{1}{4}$	28	17	...	300 $\frac{3}{4}$	174 $\frac{1}{4}$	14
" 25 . . .	714	28	22	16	290 $\frac{1}{2}$	135 $\frac{1}{2}$	10
Sept. 1 . . .	694 $\frac{1}{2}$	28	13 $\frac{1}{2}$	...	283 $\frac{1}{4}$	188 $\frac{1}{4}$	7
" 8 . . .	597 $\frac{1}{2}$	28	22 $\frac{1}{2}$	...	262 $\frac{1}{2}$	156 $\frac{1}{2}$	6
" 15 . . .	539 $\frac{1}{2}$	28	16 $\frac{1}{4}$	60	314	76 $\frac{1}{4}$	14
Total, 42 days .	4005 $\frac{1}{4}$	168	101 $\frac{1}{2}$	...	1668 $\frac{1}{4}$	1011 $\frac{1}{2}$	72
Daily average .	95 $\frac{1}{2}$	4	2 $\frac{1}{2}$	...	39 $\frac{1}{2}$	26 $\frac{1}{2}$	1 $\frac{1}{2}$
Average daily dry matter }	19.1	3.5	2=(say 24.6 lb.)				

CONTROL OX II.—*By-fodder, Linseed-cake.*

Aug. 11 . . .	700 $\frac{1}{2}$	28	10 $\frac{1}{2}$	...	229	192 $\frac{1}{2}$	31
" 18 . . .	623 $\frac{1}{2}$	28	17 $\frac{1}{4}$	19 $\frac{1}{2}$	225	108 $\frac{1}{2}$	27
" 25 . . .	671	28	17 $\frac{1}{2}$	42	265 $\frac{1}{2}$	124 $\frac{1}{2}$	20
Sept. 1 . . .	684	28	11	...	277 $\frac{1}{2}$	170 $\frac{1}{2}$	1
" 8 . . .	628 $\frac{1}{2}$	28	22	13	286 $\frac{1}{2}$	119	34
" 15 . . .	581	28	8 $\frac{1}{2}$	57	295 $\frac{1}{4}$	93	3
Total, 42 days .	3888 $\frac{1}{2}$	168	86 $\frac{1}{4}$	...	1609 $\frac{1}{4}$	808	108
Daily average .	92 $\frac{1}{2}$	4	2	...	38 $\frac{1}{2}$	19 $\frac{1}{4}$	2.57
Average daily dry matter }	18.5	3.5	1.6=(say 23.6 lb.)				

CONTROL OX III.—*No By-fodder.*

Aug. 11 . . .	792 $\frac{1}{2}$	...	16	11 $\frac{1}{2}$	257	267	35
" 18 . . .	835	...	16 $\frac{1}{2}$	...	320	241 $\frac{1}{2}$	9
" 25 . . .	853 $\frac{1}{2}$	...	21 $\frac{1}{2}$	...	336 $\frac{1}{2}$	217 $\frac{1}{4}$	44
Sept. 1 . . .	862 $\frac{1}{2}$	...	15 $\frac{1}{2}$	...	350	256	8
" 8 . . .	819 $\frac{1}{2}$	...	20 $\frac{1}{4}$	...	344 $\frac{1}{4}$	188 $\frac{1}{2}$	9
" 15 . . .	729 $\frac{1}{4}$	...	6 $\frac{1}{4}$	29 $\frac{1}{4}$	376	96	0
Total, 42 days .	4892 $\frac{1}{2}$	...	96	...	1983 $\frac{3}{4}$	1266 $\frac{1}{2}$	107
Daily average .	116 $\frac{1}{2}$	...	2.4	...	47 $\frac{1}{4}$	30	2.55
Average daily in-crease }	23.3	...	2=(say 25.3 lb.)				

TABLE VII.—ANALYSIS OF DUNG OF THREE CONTROL OXEN.

	1st week.	2d week.	3d week	4th week.	5th week	6th week.	Average.
CONTROL Ox I.	per cent.	per cent.	per cent.	per cent.	per cent	per cent	per cent
Moisture	87.67	85.41	85.30	83.47	84.88	83.38	85.02
Solids	12.33	14.59	14.70	16.53	15.12	16.62	14.98
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Solids contained—							
Albumen	12.00	11.15	10.72	11.59	10.50	9.84	10.63
Amides, &c.	3.33	1.75	2.84	1.97	2.62	1.53	2.67
Oil, &c.	4.54	3.86	5.00	4.60	4.80	5.00	4.64
Carbohydrates, &c.	42.18	45.42	44.74	45.79	43.18	47.13	44.74
Woody fibre	26.52	27.46	26.30	23.95	26.50	26.00	26.12
Ash	11.43	10.36	10.40	12.10	12.40	10.50	11.20
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Nitrogen in urine . .	0.87	0.81	1.08	0.70	1.33	1.40	1.03
CONTROL Ox II.							
Moisture	86.16	84.13	85.08	82.48	84.52	85.36	84.62
Solids	13.84	15.87	14.92	17.52	15.48	14.64	15.38
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Solids contained—							
Albumen	12.25	11.81	10.94	9.84	10.50	8.97	10.70
Amides, &c.	1.06	1.31	2.18	.66	1.75	1.97	1.49
Oil, &c.	4.20	4.00	4.80	4.60	4.55	5.40	4.59
Carbohydrates, &c.	43.69	47.18	44.58	44.70	44.10	45.26	44.92
Woody fibre	24.90	21.90	24.90	26.80	25.40	25.70	24.90
Ash	13.90	13.80	12.60	13.40	13.70	12.70	13.40
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Nitrogen in urine . .	1.19	1.64	1.19	1.05	1.54	1.47	1.35
CONTROL Ox III.							
Moisture	91.69	86.56	86.22	87.38	85.81	86.09	87.20
Solids	8.31	13.44	13.78	12.62	14.19	13.91	12.71
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Solids contained—							
Albumen	11.37	10.94	9.19	8.31	8.75	8.75	9.55
Amides, &c.	1.54	.87	2.40	3.50	1.75	1.75	1.97
Oil, &c.	4.10	4.60	4.10	4.80	4.50	5.90	4.67
Carbohydrates, &c.	43.79	49.19	43.51	43.39	46.20	44.90	45.11
Woody fibre	27.00	22.80	27.80	27.90	27.00	26.30	26.50
Ash	12.20	11.60	13.00	12.10	11.80	12.40	12.20
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Nitrogen in urine . .	0.98	0.94	0.56	0.49	1.01	1.19	0.86

THE EFFECT OF SOIL UPON THE QUALITY OF
TURNIPS.

By Mr JOHN MILNE and Dr A. P. AITKEN.

It is believed by many farmers—and, I presume, with good reason—that the feeding quality of turnips is greatly influenced by the quality of the land on which they are grown, and that the manurial treatment of the crop is a less important factor in the production of turnips of good feeding quality than the character of the soil itself. And it does not seem to be a question of which soil produces the larger crop or the better looking crop. It is believed to be simply a question of quality; for if the same seed is sown on both soils, and the same amount of manure applied in both cases, the crop produced on the better soil may be greater or it may be less, but the feeding quality of the roots grown on it is believed to be superior to that of the other.

This is what is commonly alleged, but I confess I have not yet heard of a feeding experiment so conducted as to test properly the truth of the statement. The trouble and expense of a feeding experiment are so considerable as to deter farmers from putting such theories to the only satisfactory test. Short of a feeding experiment, we have to depend on the analysis of the roots; but, unfortunately, chemical analysis, although it can determine the relative quantities of the ingredients in fodders, and also give a fairly accurate estimate of the digestibility of some of them, does not seem to be able to give with any certainty a measure of their nutritiousness. Two batches of turnips, one of which is said to be of high and the other of low feeding value, may be found to differ very slightly in their analysis; but unless by means of an actual feeding experiment, no satisfactory proof can be given that the one is really as good or the other as bad as it is given out to be; and until a satisfactory proof of that kind is given, we must still have recourse to the results of chemical analysis to shed whatever light it can upon the question.

A considerable variety of typical soils is found in the north-east of Scotland, and Mr John Milne, Inverurie, has for a number of years collected most of these; put carefully weighed quantities of the various kinds into pots, and treated them in various ways to test the relative effects of manures, especially phosphates, of different kinds upon the several soils. Thirty-five pounds of each, occupying as nearly as possible half a cubic foot, is put into each pot under exactly similar conditions,

except as to manuring, and the pots sunk in his garden. In an experiment on turnips in 1891 thus carefully conducted, an attempt was made to test the quality of the turnips grown on four soils, so far as it could be done by chemical analysis. Accordingly twenty pots were set—viz., five of each of the following kinds of soil: 1. moorish clay-slate from the Turriff district; 2. alluvial soil from the Don valley; 3. stiff red clay from the Laurencekirk district; 4. sharp poor soil from diorite rock of Wartle district; to each pot was given the same quantity of nitrate of soda, muriate of potash, and phosphate; but instead of giving the same phosphate to all, he gave to each of the five pots in each series a different phosphate, hoping thereby to gain some information regarding the effects of different kinds of phosphate, besides the larger question of the effects of the soils themselves. A carefully-selected sample of Beck's variety of yellow turnip was taken for seed, and the plants in each pot were thinned from time to time till only the strongest in each case was left. The whole series of pots was protected from accident by means of a large wire-netting frame 20 feet long, 12 feet broad, and 7 feet high.

The phosphates used for comparison were Superphosphate, Precipitated phosphate, Thomas-slag, Carolina phosphate, and Belgian phosphate, all very finely ground, and applied in quantities so regulated as to contain the same amount of phosphoric acid in each instance.

The plants, except in the case of the Wartle soil, grew normally, but as is always the case in pot-grown turnips, they did not attain the dimensions they would have attained if they had been grown in the open field, although several of the bulbs weighed over four lb. One of the plants in the Wartle soil died off, and two others fell down with disease at a later stage, therefore that series has been removed from the experiment. The turnips were all taken up at the same time, and sent to me for analysis.

The results of the analyses are shown in Table I.

It cannot be said that these carefully grown and carefully analysed turnips add much to our information of the circumstances which determine the quality of the turnips.

There is no steady trend in any one direction. The figures rise and fall, and the differences along the various lines are very considerable. Whether in the circumstances the average values derived from these figures are of any special value may be doubted. The albumen, for instance, in the turnips grown in the Turriff soil ranges from 9.7 to 14 per cent, and it is evident that to obtain a reliable average a much larger number of turnips would require to be taken. In the analyses of the turnip crops grown at Pumpherston, each sample consisted of

TABLE I.—CHEMICAL COMPOSITION OF TURNIPS GROWN IN DIFFERENT SOILS.

Clay-slate Soil from Turriff.

Manure.	1 Super- phosphate.	2 Precipitated Phosphate.	3 Slag.	4 Carolina Phosphate	5 Belgian Phosphate
Water	93.2	90.3	92.0	92.3	93.3
Solids	6.8	9.7	8.0	7.7	6.7
	100.0	100.0	100.0	100.0	100.0
Solids contained—					
Albumen	14.0	9.7	10.3	13.6	10.5
Amides, &c. . . .	7.0	4.4	5.5	3.9	6.1
Carbohydrates, &c.*	54.0	68.4	61.8	58.4	56.4
Woody fibre . . .	10.3	10.3	9.0	11.1	13.7
Ash	14.7	9.2	13.4	13.0	13.3
	100.0	100.0	100.0	100.0	100.0
*Containing sugar	3.2	3.0	4.1	3.9	3.6
<i>Alluvial Soil from Dyce.</i>					
Water	93.1	92.3	...	92.8	92.0
Solids	6.9	7.7	...	7.2	8.0
	100.0	100.0	...	100.0	100.0
Solids contained—					
Albumen	11.8	11.4	...	13.0	11.4
Amides, &c. . . .	5.2	7.2	...	4.5	2.6
Carbohydrates, &c.*	59.3	60.7	...	60.2	62.6
Woody fibre . . .	11.0	9.8	...	9.3	13.2
Ash	12.7	10.9	...	13.0	10.1
	100.0	100.0	...	100.0	100.0
*Containing sugar	3.8	4.0	...	3.9	4.1
<i>Red Clay Soil from Laurencekirk.</i>					
Water	92.7	92.5	91.8	93.3	92.3
Solids	7.3	7.5	8.2	6.7	7.7
	100.0	100.0	100.0	100.0	100.0
Solids contained—					
Albumen	14.0	12.2	14.0	13.6	11.2
Amides, &c. . . .	5.2	0.5	4.8	7.9	4.6
Carbohydrates, &c.*	59.4	65.0	58.1	48.9	54.2
Woody fibre . . .	9.6	9.5	10.4	11.5	16.0
Ash	17.8	12.8	12.7	18.1	14.0
	100.0	100.0	100.0	100.0	100.0
*Containing sugar	3.5	3.9	4.0	3.0	3.4

forty turnips, and these were selected, in the first instance, as being fairly representative bulbs. But the accidents which occur to modify the growth of any single turnip are very many, and even if it were possible to avoid differences due to the individual character of the seed itself, it is evident that the produce of a single seed affords a very unreliable basis from which to draw any practical conclusions. Nevertheless, the publication of the results of this very carefully conducted experiment is of no little value if it brings into prominence the necessity of modifying very considerably, so far as turnip-growing is concerned, a method which is very frequently employed by seekers after truth in the domain of agricultural chemistry, and which has been found to yield very trustworthy information in the case of cereals and leguminous plants.

It is evident that for similar experiments with turnips something larger than pots is required, such as boxes or areas, where a score or so of bulbs could be grown under strict control in each area.

The average results obtained are shown on Tables II. and III. A mere glance at the former shows that the kind of soil on which the turnips were grown has made very little difference in their composition. This of course may be an accident. In the same way the considerable differences shown on Table III. may be, and indeed no doubt are, accidental, for the experiments at Pumpherston, done on a large and reliable scale, have shown that the effects which manuring with different kinds of phosphate have on the composition of turnips are comparatively slight. They affect the *quantity* of the crop differently, according to their kind and condition, but the *quality* is due to a variety of circumstances, among which the kind of phosphate applied takes a very subordinate place.

The general conclusions to be drawn from this investigation are that experiments to determine the effect of different soils or manures upon the composition of the turnip crop are unreliable when only single turnips are grown in pots. A very large number of pots, or fairly large plots, would be required for the investigation, so that fair samples, consisting of at least forty bulbs, might be available from each soil or manure.

Pots containing only half a cubic foot of earth do not enable the turnip to grow to its normal dimensions.

To determine the relative feeding quality of turnips grown under different conditions, a feeding experiment carried out on a sufficiently large scale is necessary, inasmuch as the data derived from chemical analysis, as at present carried out, do not seem to yield the required information.

TABLE II.

EFFECT OF DIFFERENT SOIL ON THE COMPOSITION OF TURNIPS.

	Clay-slate.	Alluvial.	Red clay.
Water	92.2	92.5	92.5
Solids	7.8	7.5	7.5
	100.0	100.0	100.0
Solids contain—			
Albumen . . .	11.2	11.9	13.0
Amides, &c. . .	5.4	4.9	5.0
Carbohydrates, &c. .	59.8	60.7	57.0
Woody fibre . .	10.9	10.8	11.4
Ash	12.7	11.7	13.6
	100.0	100.0	100.0

TABLE III.

EFFECT OF DIFFERENT PHOSPHATES ON THE COMPOSITION OF THE TURNIP.

	Super.	Precipitate.	Slag	Carolina.	Belgian.
Water	93.0	91.8	92.0	92.8	92.8
Solids	7.0	8.2	8.0	7.2	7.2
	110.0	100.0	100.0	100.0	100.0
Solids contain—					
Albumen . . .	13.3	9.9	12.2	13.4	11.4
Amides, &c. . .	5.8	4.0	5.2	5.4	4.4
Carbohydrates, &c.	57.6	66.1	60.0	55.9	57.6
Woody fibre . .	10.3	9.5	9.6	10.6	14.2
Ash	13.0	10.5	13.0	14.7	12.4
	100.0	100.0	100.0	100.0	100.0

APPENDIX (A).

PROCEEDINGS AT BOARD MEETINGS.

MEETING OF DIRECTORS, 2D MARCH 1892.

Present.—*Vice-President*—Mr Howatson of Glenhuck. *Ordinary Directors*—Mr Ford, Fentonbarns; Mr Lumsden of Balmedie; Mr Shirra Gibb, Boon; Mr Wilken, Waterside of Forbes; Mr Lockhart, Mains of Airies; the Hon. the Master of Polwarth; Mr Stirling of Kippendavie; Mr Glendinning, Hatton Mains; Mr Ferguson, Pictstonhill; Sir Robert Menzies of Menzies, Bart.; Mr Paterson, Hill of Drip; Sir James H. Gibson-Craig of Riccarton, Bart.; Mr Marr, Cairnbrogie; Rev. John Gillespie, Mouswald; Mr Middleton, Clay of Allan; Mr Elliot of Wolfelee. *Extraordinary Directors*—Mr Walker, Portlethen; Mr Buttar, Corston; Mr Murdoch, Garteraig; Mr Macduff of Bonhard; and Mr M'Queen of Crofts. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr William Home Cook, C.A. *Engineer*—Mr James D. Park. Sir James H. Gibson-Craig, and afterwards Mr Shirra Gibb, in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir George Macpherson-Grant, Bart., President of the Society; Sir G. Graham Montgomery, Bart.; Mr Aitken, Norwood; Mr Ballingall, Dunbog; Mr Craw, Kirkton; Mr Elliot, Hollybush; Mr Forbes of Culloden; Mr Gilmour of Montrave; Captain Clayhills Henderson of Invergowie; Mr Mackenzie, Dalmore; Mr M'Lean, Dunrobin; Mr Martin of Auchendennan; Mr Maxwell, yr. of Munches; Mr Wardlaw Ramsay of Whitehill; Mr R. Sinclair Scott of Craigievar; and Mr Fisher, Jellyholm.

THE LATE DUKE OF CLARENCE.

Letters were read from the Marquis of Lothian and Sir Francis Knollys, acknowledging addresses on behalf of the Queen and the Prince and Princess of Wales.

FOOT-AND-MOUTH DISEASE.

Sir JAMES GIBSON-CRAIG proposed that the following petition be sent to the Board of Agriculture—viz., "That the Directors of the Highland and Agricultural Society petition the Board of Agriculture to prohibit the importation of fodder, litter, and raw hides from countries where foot-and-mouth disease is known to exist." This was seconded by Mr GILLESPIE, and agreed to unanimously.

SCOTTISH REPRESENTATIVE ON BOARD OF AGRICULTURE.

Letters were read from the Board of Agriculture, the First Lord of the Treasury, and the Secretary for Scotland, acknowledging receipt of the resolution of the general meeting on the above subject.

GOVERNMENT GRANT.

A letter was read from the Board of Agriculture sending a grant of £200 in consideration of general agricultural experiments and special experiments in connection with potato disease carried on during the financial year to 31st March 1892.

INVERNESS SHOW.

The SECRETARY reported that the arrangements for the ground for the Showyard had been concluded on the terms formerly reported to the Board. Committees were appointed on forage, railway arrangements, and music in the showyard. A letter was read from Mr Forbes of Culloden intimating two special prizes of £10 each—for the best shorthorn bull by Mr Ingles of Newmore, and for the best shorthorn cow by Mr Lyon Mackenzie of Braelangwell and others—which were accepted with thanks.

AGRICULTURE AND FORESTRY EDUCATION.

The SECRETARY intimated that the examination would be held on 23d, 24th, and 25th March.

IMPERIAL INSTITUTE.

The SECRETARY reported that Sir George Macpherson-Grant had been named as the representative of this Society in place of the Duke of Montrose, the late President.

PRESENTATION OF BOOKS.

Vol. xiv., 'Clydesdale Stud-Book;' vol. xvi., 'Polled Herd-Book;' and vol. iv., 'Hunters' Improvement Society,' were presented and accepted with thanks.

MEETING OF DIRECTORS, 4TH APRIL 1892.

Present.—*President*—Sir George Macpherson-Grant of Ballindalloch, Bart., in the chair. *Vice-Presidents*—Mr Martin of Auchendunn, and Mr Howatson of Glenbuck. *Ordinary Directors*—Mr Ballingall, Dunbog; Mr Ford, Fentonbarns; Mr Lumsden of Balmedie; Mr Forbes of Culloden; Mr Shirra Gibb, Boon; Mr Gilmour of Montrave; Mr Fisher, Jellyholm; Mr Lockhart, Mains of Airies; Mr Cran, Kirkton; the Hon. the Master of Polwarth, Humble House; Mr Glendinning, Hatton Mains; Mr Gordon of Newton; Mr Aitken, Norwood; Mr Ferguson, Pictstonhill; Mr Elliot, Hollybush; Mr Sinclair Scott, Craigievar; Sir Robert Menzies of Menzies, Bart.; Mr Paterson, Hill of Drip; Mr Marr, Cairnbrogie; Rev. John Gillespie, Mouswald Manse; Mr Middleton, Clay of Allan; Mr Elliot of Wolfelee. *Extraordinary Directors*—Major Rose of Kilravock; Provost Ross of Inverness; Mr McLean, Dunrobin; Mr Buttar, Corston; Mr Murdoch, Garraig; Mr Mackenzie, Dalmore; Mr Macduff of Bonhard. *Treasurer*—Sir William Stuart Walker, K.C.B. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr Wm. Home Cook, C.A. *Engineer*—Mr J. D. Park.

Mr F. N. MENZIES reported apologies for the absence of Sir Kenneth Mackenzie of Gairloch, Bart.; Mr Black of Sheriffston; Major Randle Jackson of Swindale; Mr Kerr, Broomhouse; Mr McGibbon, Ardnaclaig; Mr McQueen of Crofts; Mr Miller of Scrabster; Mr Warillaw Ramsay of Whitehill; Col. Stirling of Kippendavie; Mr Turner, Portland Estate Office; and Mr Walker, Portlethen.

DEATH OF MR FORBES IRVINE OF DRUM.

Before proceeding to the business on the programme, the following resolutions were unanimously adopted:—

"That the Directors desire unanimously to express the deep and sincere regret with which they have received the intimation of the death of Mr Alex. Forbes Irvine of Drum.

"That the Directors have in the minutes of the Board meeting of 6th March 1889, and of the general meeting of 19th June upon Mr Forbes Irvine's resignation of the chairmanship of the Committee on Publications, recorded their sense of the benefits derived from his assistance during a very long and intimate relation with the Society, not only in connection with the Publications for thirty-five years, but as a Director and Chairman of the Local Committee for the general Shows at Aberdeen in 1868, 1876, and 1885; it only remains for the Directors to deplore the loss which they and the Society have now sustained by his death.

"That the Directors request the Secretary to transmit a copy of these resolutions to Mrs Forbes Irvine, with their respectful condolence and sympathy upon the occasion of the painful bereavement which she and her son have sustained."

RETIREMENT OF SENIOR CLERK.

The SECRETARY read the following letter from Mr Thomas Duncan :—
 “DEAR SIR,—I beg respectfully through you to offer to the Directors of the Highland and Agricultural Society my most sincere acknowledgments for the kind expressions contained in the minutes in regard to the services I have been enabled to render during the long period of my connection with the Society. I have also to return my grateful thanks for the retiring allowance voted to me by the Society on the recommendation of the Directors; and I need not say that as long as I am spared all the tokens I have experienced of the favour of the Directors will be remembered with pleasure, as well as the great kindness I have uniformly received from yourself personally during the past twenty-six years. Trusting that the Society will continue to prosper and carry out successfully all the good works in which it is engaged—I am,
 yours respectfully,
 THOMAS DUNCAN.

“To F. N. Menzies, Esq.”

FOOT-AND-MOUTH DISEASE.

A letter was read from the Board of Agriculture acknowledging receipt of the Society's resolution on the subject of prohibiting the importation of fodder, raw hides, &c., from countries where above disease exists.

WEIGHING OF CATTLE IN SALEYARDS.

A letter was read from the Board of Agriculture with reference to exemption of salesmen from providing suitable facilities for weighing of live animals. The Directors instructed the Secretary to inform the Board that they saw no reason for the proposed exemptions.

SHOWYARD EXPENDITURE.

A Report by the Committee of 6th April was submitted and approved.

RESIGNATION OF SECRETARY.

After Mr MENZIES having stated to the Directors the reasons why he placed his resignation upon the programme, the Directors, after deliberation, came to the following resolution—“That Mr Menzies having placed on the table his resignation as Secretary of the Society, while accepting said resignation, to take effect at the close of the present financial year, resolved to place on record their strong sense of the zeal and energy with which Mr Menzies has served the Society during the last twenty-six years.”

INVERNESS SHOW.

Mr Forbes of Culloden was appointed Convener of Local Committee. It was remitted to the Local Directors, ordinary and extraordinary, to appoint the Local Committee. The following were appointed the Stewards for the Show: *Horses*—Sir Allan R. Mackenzie of Kintail, Bart. *Cattle*—Rev. John Gillespie, Mouswald Manse. *Sheep, Swine, &c.*—Mr Elliot, Hollybush. *Forage*—Mr Butlar, Corston. *Parade Gallery*—Mr Macduff of Bonhard. The Secretary was instructed to send schedules to former exhibitors, requesting lists of judges to be sent to him for the use of the Directors.

SPECIAL PRIZES.

A letter was read from Mr Howatson of Glenbuck offering the following prizes for blackfaced sheep: Tup above two shear, £5, £3, and £1; five shearing tups, bred and fed by exhibitor, £4, £2, and £1; tup lamb, bred and fed by exhibitor, £3, £2, and £1; sheep, in any class, carrying the fleece best adapted for protecting the animal, £2, £1, and 10s.—in all, £25, 10s. These prizes were accepted by the Directors, with best thanks.

CHALLENGE CUPS.

A letter was read from Mr Macpherson Grant suggesting that the Ballindalloch Cups shall become the property of the exhibitor who shall win them five times not necessarily in succession. The suggestion was adopted.

A motion by Mr GORDON, Newton, that no challenge cup in perpetuity be accepted under the well-ascertained value of fifty guineas; and also another motion by Mr WILKEN, Waterside of Forbes, that no challenge cup or prize of less value than one

hundred guineas be accepted by the Society for stock, and only if the same can be gained by the same exhibitor at three shows not necessarily in succession, were considered together, and after considerable discussion, Mr Gordon's motion, as altered below, was adopted—viz.: "That no challenge cup in perpetuity be accepted, and that no challenge cups or challenge prizes be accepted under the well-ascertained value of fifty guineas."

AGRICULTURAL LABOURERS IN SCOTLAND.

A letter was read from the Secretary for Scotland requesting information on the above subject for the Royal Labour Commission. Mr Menzies having sent a circular to the Directors on the subject, he was instructed from the replies received to send the information to the Secretary for Scotland.

ADULTERATION OF MANURES AND FEEDING-STUFFS.

The Rev. JOHN GILLESPIE moved—"That the Government having appointed a Department Committee to inquire and report regarding the adulteration of manure and feeding-stuffs with a view to legislation, it be remitted to the Chemical Committee to consider whether evidence should be offered on behalf of this Society, with power to the Committee to arrange for witnesses being sent, should it be considered advisable to do so." This was agreed to.

AGRICULTURAL AND FORESTRY EXAMINATIONS.

A report of the examinations, which have already appeared in the newspapers, was submitted.

MICE PLAGUE.

The following motion was moved by the Rev. JOHN GILLESPIE of Mouswald, seconded by Mr ELLIOT, Hollybush, and unanimously agreed to: "That the Directors of the Highland and Agricultural Society, having under consideration the report of the Board of Agriculture on the plague of voles, resolve, in view of the gravity of the circumstances, to make a representation to the Board in favour of a much more thorough and systematic investigation being taken by that Board than has yet been attempted."

PRESENTATION OF BOOKS.

Volume xii. of the 'Galloway Herd-Book' was received, and accepted with thanks.

MEETING OF DIRECTORS, 4TH MAY 1892.

Present.—*President*—Sir George Macpherson-Grant of Ballindalloch, Bart., in the chair. *Vice-Presidents*—Mr Martin of Auchendennan; Mr Howatson of Glenbuck. *Ordinary Directors*—Mr Ballingall, Dunbog; Mr Ford, Fentonbarns; Mr Lumsden of Balmedie; Mr Shirra Gibb, Boon; Mr Gilmour of Montrave; Mr Fisher, Jellyholm; Mr Wardlaw Ramsay of Whitehill; Mr Wilken, Waterside of Forbes; the Hon. the Master of Polwarth, Humber House; Mr Glendinning, Hatton Mains; Mr Gordon of Newton; Mr Aitken, Norwood; Mr Ferguson, Pictstonhill; Sir Robert Menzies of Menzies, Bart.; Mr Paterson, Hill of Drip; Mr Marr, Cairnbrogie; Rev. John Gillespie, Mouswald. *Extraordinary Directors*—Major Randle Jackson of Swordale; Mr M'Lean, Dunrobin; Mr Buttar, Corston; Mr Macpherson Grant of Drumduan; Mr Mackenzie, Dalmore; Mr Macduff, Bonhard. *Hon. Secretary*—Sir G. Graham Montgomery of Stanhope, Bart. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr Wm. Home Cook, C.A. *Engineer*—Mr J. D. Park.

Mr F. N. MENZIES reported apologies for the absence of Sir Kenneth Mackenzie of Gairloch, Bart.; Sir Allan Mackenzie of Glenmuick, Bart.; Mr Anderson of Lochdhu; Mr Cran, Kirkton; Mr Elliot, Hollybush; Mr Forbes of Culloden; Mr Kerr, Broomhouse; Mr M'Queen of Crofts; Mr Middleton, Clay of Allan; Mr Murdoch, Gartcraig; Mr Sinclair Scott, Craigievar; Mr Stirling of Kippendavie; and Mr Walker, Portlithen.

THE LATE ALEXANDER FORBES IRVINE, ESQ. OF DRUM.

A letter was read from Mr Francis H. Forbes Irvine thanking the Directors for their kindly expression of regret in regard to his father's death.

GENERAL MEETING.

Wednesday, the 15th June, was fixed as the date for holding the half-yearly General Meeting of the Society.

FINANCE.

A minute of the Finance Committee of 4th May, with reference to the change of investment of funds, was submitted and approved.

GOVERNMENT GRANT.

It was resolved to make an application to Government for a grant for experiments for next year.

ROYAL COMMISSION ON LABOUR.

A letter was read from the Secretary for Scotland expressing the Marquis of Lothian's thanks for the expeditious manner in which the Society had collected the information in regard to the customs in certain districts of Scotland as to the housing and payment of farm-labourers, and transmitting a letter from the Royal Commission on Labour, offering thanks to the Highland and Agricultural Society for the valuable information contained in their returns.

PLAGUE OF VOLES.

A letter was read from James Hozier, Esq., M.P., acknowledging the resolution passed at the last meeting of the Board, and stating that he would be willing to do all in his power to carry out the views of the Board in pressing for a more thorough and systematic investigation being undertaken by the Board of Agriculture. A letter was also read from the Board of Agriculture, stating that the Board have agreed to take steps to collect further information, obtainable either at home or from foreign sources, which may throw further light on the best means of arresting the progress of the plague.

The following motion by the Rev. JOHN GILLESPIE was adopted: "That the Directors express their gratification for the promise of the President of the Board of Agriculture to make further inquiry into the plague of voles, and that the following be appointed a Committee to co-operate with, and give assistance to, the body making the investigation: Messrs Walter Elliot, Hollybush; C. Howatson of Glenbuck; R. Gibb, Boon; Sir Thomas Gibson Carmichael; J. T. S. Elliot of Wolfelce; J. M. Aitken, Norwood; the Secretary; and the Rev. John Gillespie, Convener.

ADULTERATION OF MANURES.

On the recommendation of the Chemical Committee, Dr Aitken was appointed to represent the Society in giving evidence before the Departmental Committee on the above subject.

REPORTING BOARD MEETINGS.

A motion by Mr MARR, "That reporters be admitted to meetings of the Board of Directors," not finding a seconder, fell to the ground.

INVERNESS SHOW.

The SECRETARY reported that he had attended a meeting in Inverness, when a Local Committee was nominated. The Secretary was instructed to procure hotel accommodation. He reported that Mr Walker, Torbreck, had been selected to supply the forage for the stock. He also intimated that the last days of entry were as follows: *Implements*—23d May. *Stock, &c.*—20th June.

SHOW 1893.

On the motion of the Rev. JOHN GILLESPIE, it was unanimously resolved that, subject to satisfactory local arrangements, pecuniary and otherwise, the Show be held at Edinburgh in 1893.

SHOW 1894.

A similar motion by Mr MARTIN, that the Show for 1894 be held at Aberdeen, was also unanimously agreed to.

AGRICULTURAL EDUCATION.

It was resolved, in accordance with the motion passed on the 21 March, that the Society should cease to contribute sums of money for technical education, that the hursaries should terminate, and that the by-laws be adjusted accordingly.

PUBLICATIONS.

A minute of the Committee of 4th May, detailing the remuneration to be given to the writers of the various reports to be published in this year's 'Transactions,' was read and approved.

MEETING OF DIRECTORS, 1st JUNE 1892.

Present.—*Vice-Presidents*—Mr Martin of Auchendennan, in the chair; Mr Howatson of Glenbuck. *Ordinary Directors*—Sir James R. G. Maitland of Barnton, Bart.; Mr L. Ballingall, Dunbog; Mr Ford, Fentonbarns; Mr Maxwell, yr. of Munches; Mr Shirra Gibb, Boon; Mr Gilmour of Montrave; Mr Fisher, Jellyholm; Mr Lockhart, Mains of Airies; Mr Cran, Kirkton; the Hon. the Master of Polwarth, Humber House; Mr Stirling of Kippendavie; Mr Glendinning, Hatton Mains; Mr Aitken, Norwood; Mr Ferguson, Pictstonhill; Mr Sinclair Scott, Burnside; Sir Robert Menzies of Menzies, Bart.; Mr Paterson, Hill of Drip; Mr Marr, Cairnbrogie; Rev. John Gillespie, Mouswald Manse; Mr Middleton, Clay of Allan. *Extraordinary Directors*—Major Randle Jackson of Swordale; Mr Walker of Portlethen; Mr M'Queen of Crofts; Captain Clayhills Henderson of Invergowrie, R.N.; Mr Buttar, Corston; Mr Murdoch, Garterraig; Mr Macpherson Grant of Drumduan; Mr Mackenzie, Dalmore; Mr Macduff, Bonhard. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr Home Cook, C.A. *Engineer*—Mr J. D. Park.

Mr F. N. MENZIES reported apologies for the absence of Sir George Macpherson-Grant of Ballindalloch, Bart.; Sir Wm. S. Walker, K.C.B.; Mr Elliot, Hollybush; Mr Forbes of Culloiden; Mr Gordon of Newton; Mr Lumsden of Balmedie; Mr M'Gibbon, Ardnamrag; Mr Mutter of Scrabster.

DEATH OF MR KERR, BROOMHOUSE.

Before proceeding to the business on the programme, the Directors resolved to record in the minutes the deep regret with which they regard the death of Mr John Kerr, Broomhouse, and their sense of the assistance which the Society had for thirty years received from him as a member, a Director, and Steward of Implements at the General Shows.

SECRETARYSHIP REPORT BY COMMITTEE.

The following seven names were recommended as a short list for further inquiry and ultimate selection—viz.: Patrick William Ballingall, Colin Campbell, George William Constable, Robert William Ewart, James Macdonald, Archibald MacNeillage, and Robert Hunter Pringle—the election to take place at the next meeting on the 15th instant.

MICE PLAGUE.

A letter from the Board of Agriculture, acknowledging resolution by the Directors on 4th May, was read.

INVERNESS SHOW.

A meeting of Local Committee at Inverness on 27th May was reported. Police arrangements for the Show were reported. Mr George R. Glendinning, Hatton Mains, was appointed Steward of Implements in place of the late Mr Kerr. It was reported that the following had been appointed refreshment purveyors: John Mitchell, 3 India Street, Edinburgh; John Brodie, 52 Lothian Street, Edinburgh; Messrs Wilson, 251 Argyle Street, Glasgow, and Perth; and William Macbean, Imperial Hotel, Inverness. It was arranged that the band of the Second Battalion Queen's Own Cameron Highlanders be engaged for the Show. The Directors who are to act as attending members were selected. It was arranged that a short service be held in the pavilion on the Sunday previous to the Show by Dr Norman Macleod, Inverness, with the approval of the Rev. Dr Scott, the Chaplain of the Society.

BEE EXHIBITION.

It was arranged that the same facilities should be given as formerly to the Scottish Beekeepers' Association for holding their bee exhibition within the yard.

The SECRETARY reported that he was to meet the contractor on the 6th instant to lay off the Showyard.

AGRICULTURAL EDUCATION.

It having been decided that the bursaries of the Society were to terminate, the by-law regarding them was annulled.

MEETING OF DIRECTORS, 15TH JUNE 1892.

Present.—*President*—Sir George Macpherson-Grant of Ballindalloch, Bart., in the chair. *Vice-Presidents*—Mr Cameron of Lochiel; Mr Martin of Auchendennan; Mr Howatson of Glenbuck. *Ordinary Directors*—Sir Jas. R. G. Maitland of Barnton, Bart.; Mr Turner, Kilmarnock; Mr Ballingall, Dunbog; Mr Ford, Fentonbarns; Mr Lumsden of Balmedie; Mr Forbes of Culloden; Mr Shirra Gibb, Boon; Mr Gilmour of Montrave; Mr Fisher, Jellyholm; Mr Wardlaw Ramsay of Whitehill; Mr Wilken, Waterside of Forbes; Mr Lockhart, Mains of Airties; Mr Cran, Kirkton; Hon. the Master of Polwarth; Mr Stirling of Kippendavie; Mr Anderson, Lochdhu; Mr Glendinning, Hatton Mains; Mr Gordon of Newton; Mr Aitken, Norwood; Mr Ferguson, Pictstonhill; Mr M'Gibbon, Ardnacraig; Mr Elliot, Hollyhush; Mr Sinclair Scott, Burnside; Sir Robert Menzies of Menzies, Bart.; Mr Paterson, Hill of Drip; Mr Marr, Cairnbrogie; Rev. John Gillespie, Mouswald; Mr Middleton, Clay of Allan; Mr Elliot of Wolflee. *Extraordinary Directors*—Major Rose of Kilravoch; Major Randle Jackson of Swordale; Mr Fletcher of Roselaugh; Mr Miller of Scrabster; Mr Black of Sherriffston; Mr M'Lean, Dunrobin; Sir Allan R. Mackenzie of Glenminick, Bart.; Mr Walker, Portlethen; Captain Clayhills Henderson of Invergowie, R.N.; Mr Buttar, Corston; Mr Murdoch, Garteraig; Mr Macpherson Grant of Drumduan; Mr Mackenzie, Dalmore; Mr Macduff of Bonhard. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr Home Cook, C.A. *Engineer*—Mr J. D. Park.

SECRETARYSHIP.

As agreed upon at the Board meeting on the 1st of June, the Directors proceeded to vote by ballot on the short list of seven candidates submitted by the Committee. Forty-six Directors were present, and the result of the vote was as follows: Mr James Macdonald, Agricultural Superintendent, Royal Dublin Society, 24; Mr A. MacNeillage, Secretary of the Clydesdale Horse Society, 13; Mr Colin Campbell of Jura, 3; Mr G. W. Constable, Glencraig, Lochgully, 3; Mr P. W. Ballingall, Blair-Drummond, 2; Mr R. W. Ewart, Allershaw, Lanarkshire, 1; Mr Robert Hunter Pringle, Kingston, 0. Mr Macdonald, having on the first vote an absolute majority over the other candidates, was declared duly elected.

The rest of the business referred to the Inverness Show and the arrangement of the programme for the General Meeting.

MEETING OF DIRECTORS, 2D NOVEMBER 1892.

Present.—*Vice-Presidents*—Mr Martin of Auchendennan; Mr Howatson of Glenbuck. *Ordinary Directors*—Sir James R. J. Maitland of Barnton, Bart.; Mr Ballingall, Dunbog; Mr Ford, Fentonbarns; Mr Lumsden of Balmedie; Mr Shirra Gibb, Boon; Mr Fisher, Jellyholm; Mr Wardlaw Ramsay of Whitehill; Mr Lockhart, Mains of Airties; Mr Cran, Kirkton; the Hon. the Master of Polwarth, Humble House; Mr Stirling of Kippendavie; Mr Glendinning, Hatton Mains; Mr Aitken, Norwood; Mr Ferguson, Pictstonhill; Mr Elliot, Hollyhush; Sir Robert Menzies of Menzies, Bart.; Mr Paterson, Hill of Drip; Sir James H. Gibson-Craig of Riccarton, Bart.; Rev. John Gillespie, Mouswald; Mr Middleton, Clay of Allan. *Extraordinary Directors*—Captain Clayhills Henderson of Invergowie, R.N.; Mr Buttar, Corston; Mr Murdoch, Garteraig; Mr Mackenzie, Dalmore; Mr Macduff of Bonhard. *Treasurer*

—Sir William Stuart Walker, K.C.B. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr Home Cook. C.A. *Engineer*—Mr J. D. Park. Mr Martin of Auchendennan, and afterwards Sir Robert Menzies, Bart., in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir George Macpherson-Grant of Ballindalloch, Bart.; Sir G. Graham Montgomery of Stanhope, Bart.; Sir Allan Mackenzie, Bart.; Mr Forbes of Culloden; Mr Gilmour of Montrave; Mr Gordon of Newton; Mr Macpherson Grant of Drumduan; Major Randle Jackson of Swordale; Mr M'Gibbon of Ardnacraig; Mr M'Lean, Dunrobin; Mr M'Queen of Crofts; Mr Sinclair Scott, Burnside; Mr Wilken, Waterside of Forbes.

DEATH OF MR WILLIAM SMYTHE OF METHVEN.

Before proceeding to the business on the programme, the Directors resolved to record in the minutes an expression of the deep regret with which they have received the intimation of the death of Mr William Smythe of Methven, and their sense of the assistance rendered by him as a member of the Society for forty-six years, as an Extraordinary Director in 1871 and 1879, and as Convener of the Local Committee for Perth Show in 1871.

INVERNESS SHOW.

The SECRETARY submitted the list of awards, which was approved of, and he was instructed to issue the proofs.

EDINBURGH SHOW, 1893.

A deputation from the Edinburgh Agricultural Association, consisting of Mr Usher of Morton, Mr Cross, Craigiehall, Mr Elliot, Newhall, Mr Stenhouse, Edinburgh, and Mr Wyllie the Secretary, waited on the Directors with a view to arranging that several classes in the horses and sheep sections be included in the prize-list to their satisfaction, their Society having agreed not to hold a show in 1893 on condition that their suggestions be adopted. The deputation stated their proposals, and the Chairman, Mr Martin, thanked the deputation for their co-operation, and stated that the Directors would be glad to give their views every consideration, at the same time reminding them that it is a condition of holding the Shows in the various districts that no local shows be held in the district in the months of June, July, and August of that year. The deputation then withdrew.

SPECIAL PRIZES.

The SECRETARY reported the following special prizes: Mr Macpherson Grant of Drumduan, £24 for three-year-old Aberdeen-Angus cows; the Shorthorn Society, £20 for the best shorthorn bull; Mr Lockhart, Mains of Airies, £10 for the best Clydesdale stallion; Farmer's Supply Association of Scotland, a prize for best farmer's cart and cattle weigh-bridge,—which were all accepted, and thanks voted to the donors. Committees were appointed to look out for ground suitable for the Show, and also to draw up a scheme for the light-legged horses and jumping.

LOCAL SUBSCRIPTIONS.

A Committee of the Directors in the district connected with the Edinburgh Show, the three Lothians, with Sir James Gibson-Craig as Convener, were appointed to raise a fund in aid of the expenses of the Show.

ABORTION IN COWS.

It was resolved, on the recommendation of the Committee, to discontinue the investigation, dissolve the Committee, and return the subscriptions collected.

FORESTRY AND HIGHLAND INDUSTRIES.

The SECRETARY reported that he had sent out over 5500 circulars requesting subscriptions for the endowment of the Chair of Forestry in the University of Edinburgh. He regretted that the result had been disappointing, but that the sum now subscribed from all sources amounted to over £2300. The awards for the Highland Industries at Inverness were approved of.

MACHINERY.

On the suggestion of the Machinery Committee, the Directors agreed to hold an exhibition of binders at work in the district of Edinburgh next year.

CHEMICAL DEPARTMENT.

The experiments to be carried out in 1893 were submitted and approved of.

PUBLICATIONS.

The reports in competition were reported, and the readers appointed by the Committee were approved of.

OFFICE-BEARERS AND DIRECTORS.

A Committee was appointed to prepare the list of office-bearers, and report to next meeting.

VOLE PLAGUE.

A letter was read from Mr Paterson of Birthwood, asking for a subscription towards the expense of the Committee appointed to inquire into the vole plague, and procure evidence for the Departmental Committee. After considerable discussion it was resolved to delay consideration of the matter till next meeting, and in the meantime to endeavour to ascertain what steps have been taken with the view of raising subscriptions from the proprietors and others in the districts affected.

QUEEN'S PREMIUM STALLIONS.

A letter was reported from Mr Gilmour of Montrave, stating that at a meeting of the Royal Commission on Horse-breeding it had been decided to allocate two additional thoroughbred stallions to Scotland—one to be located in the Lothians, and the other in the Border districts, making six in all for Scotland.

MEETING OF DIRECTORS, 7TH DECEMBER 1892.

Present.—*Vice-Presidents*—Mr Martin of Auchendennan and Mr Howatson of Glenbuck. *Ordinary Directors*—Mr Ballingall, Dunbog; Mr Maxwell, yr. of Munches, M.P.; Mr Shirra Gibb, Boon; Mr Gilmour of Montrave; Mr Fisher, Jellyholm; Mr Wardlaw Ramsay of Whitehill; Mr Cran, Kirkton; the Hon. the Master of Polwarth, Humber House; Mr Stirling of Kippendavie; Mr Glendinning, Hatton Mains; Mr Ferguson, Pictstonhill; Mr Elliot, Hollybush; Sir Robert Menzies of Menzies, Bart.; Mr Paterson, Hill of Drip; Sir James H. Gibson-Craig of Riccarton, Bart.; Mr Middleton, Clay of Allan. *Extraordinary Directors*—Sir Allan R. Mackenzie of Glenmuick, Bart.; Mr M'Queen of Crofts; Captain J. D. Clayhills Henderson of Invergowrie, R.N.; Mr Buttar, Corston; Mr Murdoch, Gartcrraig; Mr Macpherson Grant of Drumduan; Mr Macduff of Bonhard. *Hon. Secretary*—Sir G. Graham Montgomery of Stanhope, Bart. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr Home Cook, C.A. *Engineer*—Mr J. D. Park. Mr Martin in the chair.

Mr F. N. MENZIES reported apologies for the absence of Sir George Macpherson-Grant of Ballindalloch, Bart.; Sir W. S. Walker, K.O.B.; Mr Aitken, Norwood; Mr Elliot of Wolfelee; Rev. John Gillespie, Mouswald; Mr Gordon of Newton; Mr Forbes of Culloden; Mr Ford, Fentonbarns; Mr Lockhart, Mains of Airies; Mr Lumsden of Balmedie; Mr Mackenzie, Dalmore; Mr Turner, Kilmarnock; Mr Walker, Portlethen; Mr Wilken, Waterside of Forbes.

GENERAL MEETING.

The date of the anniversary General Meeting was fixed for Wednesday, the 18th of January, at one o'clock.

PRESIDENT.

The SECRETARY read a letter from Major-General Sir Francis de Winton, stating that his Royal Highness the Duke of York would allow himself to be nominated as President of the Society for the year 1893. The other Office-bearers and Directors were nominated to fill vacancies, and their names will be published on their acceptance of office.

INVERNESS SHOW—TRANSFERENCE OF MEMBERS' TICKETS.

The SECRETARY reported that, as instructed, he had written to all the members whose tickets had been presented by other parties at the ticket-gate of the Inverness Show, and that he had received explanations from all except four. The total number was twenty-four.

EDINBURGH SHOW—SITE FOR SHOWYARD.

The Committee appointed to select ground for the Show at Edinburgh in 1893 reported that, after having very carefully considered all the sites suggested, they were unanimously of opinion that the two most eligible sites were the East Meadows and the Dean Park, where the Centenary Show of the Society was held. They applied to the Town Council for the East Meadows, which was refused. They have therefore approached the owner of the Dean Park, and come to terms with him for the use of said ground.

The premium-list and regulations for the Edinburgh Show were further considered. Special prizes were reported from the Polled Cattle Society, from Mr Howatson of Glenbuck, from the Edinburgh Agricultural Association, Mr Gilmour of Montrave, Captain Clayhills Henderson of Invergowrie, and the Hackney Horse Society. All these special prizes were accepted with best thanks.

RAILWAY CHARGES FOR ATTENDANTS ON STOCK.

Letters from Mr Bruce, Aberdeen, and from the Secretary of the Agricultural Exhibitors' Association, were read with reference to cancelling the free passes to men in charge of stock, and the Secretary was instructed to communicate with the Rev. John Gillespie, at present in London, to ask him to go with the deputation to the Clearing House to-morrow to oppose the taking away of said free passes.

CHAIR OF FORESTRY IN THE UNIVERSITY OF EDINBURGH.

On the motion of Sir ROBERT MENZIES, it was agreed to recommend the General Meeting to make an annual grant of £50 in aid of said Chair, until a sufficient sum has been raised for its endowment.

NATIONAL AGRICULTURAL CONFERENCE.

Mr MENZIES reported that, after having applied to the President and some other members of the Board to see if they could attend the Conference, ineffectually, he had requested Sir Mark Stewart, M.P., to attend on behalf of the Society.

DISTRICT SHOWS.

The report by the Committee on District Shows was approved of; Mr Maxwell, younger of Munches, and Mr Howatson of Glenbuck dissenting as to the withdrawal of the £20 to the Kilmarnock Cheese Show.

CHEMICAL AND BOTANICAL DEPARTMENT.

The minute of the Committee was approved with reference to experiments to be carried out next year.

DAIRY DEPARTMENT.

The minute of Committee was approved allocating the £100 grant as follows: £60 to the Kilmarnock Dairy School, £20 to the Angus and Mearns Dairy School, and £20 to the Royal Northern Society Dairy School; and requesting a grant of £100 for the following year to be allocated at the discretion of the Committee, and not to be used if the County Councils sufficiently subsidise the Dairy Schools and dairy education.

FORESTRY AND HIGHLAND INDUSTRIES.

The prize-list for the Edinburgh Show was submitted and approved.

ARGYLL NAVAL FUND.

The report by Committee of 5th December was submitted and approved. The report shows that there is no vacancy amongst the recipients at present, and that, owing to the state of the funds, they cannot recommend that another recipient be added.

MR THOMAS FISKEN, INVENTOR OF THE STEAM-PLOUGH.

MR MENZIES read an appeal on behalf of Mr Fisken, who has fallen into very indigent circumstances. A subscription list was opened by the Directors, and ordered to be submitted at next meeting of the Board, and the Secretary was authorised in the meantime to receive subscriptions.

MEETING OF DIRECTORS, 4TH JANUARY 1893.

Present.—*Vice-Presidents*—Mr Martin of Auchendennan, and Mr Howatson of Glenbuck. *Ordinary Directors*—Sir James R. G. Maitland of Barnton, Bart.; Mr Ford, Fentonharns; Mr Lunnsden of Balmadie; Mr Shirra Gibb, Boon; Mr Fisher, Jellyholm; Mr Glendinning, Hatton Mains; Mr Elliot, Hollybush; Sir Robert Menzies of Farleyer, Bart.; Sir James H. Gibson-Craig of Riccarton, Bart.; Rev. John Gillespie, Mouswald; Mr Middleton, Clay of Allan. *Extraordinary Directors*—Mr Miller of Scrabster; Mr Walker, Portlethen; Captain G. D. Clayhill, Henderson of Invergowie, R.N.; Mr Buttar, Corston; Mr Macpherson Grant of Drumduan; Mr Macduff of Bonhard. *Hon. Secretary*—Sir G. Graham Montgomery of Stanhope, Bart. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr Home Cook, C.A. *Engineer*—Mr J. D. Park. Mr Martin in the chair.

MR MACDONALD reported apologies for the absence of Sir Allan R. Mackenzie of Glenmuick, Bart.; Mr Aitken, Norwood; Mr Cran, Kirkton; Mr Ferguson, Piets-tonhill; Mr Forbes of Culloden; Mr Gilmore of Montrave; Mr Gordon of Newton; Mr Murdoch, Gartnraig; Mr Paterson, Hill of Drip; Mr Sinclair Scott, Burnside; Mr Stirling of Kippendavie.

DEATH OF MR T. S. ELLIOT OF WOLFEELE.

Before proceeding to the business on the programme, the Directors resolved to record in the minutes the deep regret with which they regard the death of Mr T. S. Elliot of Wolfleele, one of their number, and their sense of the assistance which the Society received from him as a Director, a member of various Committees, and a Steward of the General Show; and that a copy of this resolution be communicated to Mrs Elliot, with the Directors' respectful condolence with her and other members of the late Mr Elliot's family in their painful bereavement.

MR F. N. MENZIES.

The CHAIRMAN said that it was not generally understood by the Directors that their December meeting would be the last conducted by their late Secretary, Mr F. N. Menzies. He was sure they would cordially concur with him in expressing their goodwill towards Mr Menzies, and their sense of the great attention and zeal with which he had served the Society. The suggestion was heartily endorsed, and the Chairman was requested to convey the sense of the Directors to Mr Menzies.

MR MACDONALD.

The CHAIRMAN desired, in name of the Directors, to express their good wishes to the new Secretary, Mr Macdonald, whom they now found in his place, and to assure him of the cordial co-operation of the Directors in the discharge of his duties.

OFFICE-BEARERS AND DIRECTORS.

The Office-bearers and Directors for the vacancies for 1893, as suggested by the Committee and published in the newspapers, were approved of. The Directors feel sure that the acceptance of the Presidency for 1893 by H. R. H. the Duke of York, K.G., will evince the greatest satisfaction throughout the country. Mr Gideon Pott was nominated to fill the vacancy caused by the death of Mr Elliot.

FINANCE.

The accounts for 1891-92, as prepared by the Auditor, and approved by the Finance Committee, were laid on the table.

SUBSCRIPTIONS IN AID OF MR FISKEN.

The SECRETARY reported that the movement to obtain funds for Mr Fiskén, the inventor of steam-ploughing tackle, had been so far favourably received, and the subscriptions now obtained amounted to £30. The Directors unanimously agreed to urge Mr Fiskén's claim to a grant from the Civil List, and decided that the subject be commended to the members at the General Meeting on the 18th instant.

EDINBURGH SHOW.

It was reported that the arrangements had now been completed for the use of the Dean Park, Edinburgh, for the General Show of 1893.

A letter was read from the Secretary of the Clydesdale Horse Society, offering the Cawdor Challenge Cup for best Clydesdale mare at the Edinburgh Show, the offer being accepted with thanks.

A letter was read from the Secretary of the Edinburgh Agricultural Association, intimating a grant of £60 towards the funds of the Show. The offer was accepted with thanks.

A letter was read from Mr Howatson of Glenbuck, offering additional prizes for blackfaced sheep on behalf of West Country breeders, and the offer was accepted with thanks.

The prize-list for the Show was further considered, and its final adoption deferred till next meeting.

GENERAL STEWARD OF SHOWYARD.

It was resolved, on the motion of Mr C. MACPHERSON GRANT, that it be remitted to a Committee to reconsider the proposal to appoint a General Steward of the Showyard.

GRANT TO KILMARNOCK CHEESE SHOW.

A letter was read from the Secretary of the Ayrshire Agricultural Association protesting against the withdrawal of the £20 grant to the above Show, and expressing the hope that the Directors would reconsider the matter, and so save the attendance of members from the district to support the vote at the General Meeting on the 18th instant. A motion to reconsider the matter and continue the grant was lost by twelve votes to two.

AGRICULTURAL AND FORESTRY EXAMINATIONS.

The date of the annual examinations was fixed for the 22d, 23d, and 24th March.

MEETING OF DIRECTORS, 18TH JANUARY 1893.

Present.—*Vice-President*—Mr Martin of Auchendennan in the chair. *Ordinary Directors*—Mr Ballingall, Dunbog; Mr Ford, Fentonbarns; Mr Shirra Gibb, Boon; Mr Gilmour of Montrave; Mr Fisher, Jellyholm; Mr Wardlaw Ramsay of Whitehill; Mr Cran, Kirkton; the Hon. the Master of Polwarth; Mr Stirling of Kippendavie; Mr Glendinning, Hatton Mains; Mr Ferguson, Pictonhill; Mr M'Gibbon, Ardnacraig; Mr Elliot, Hollybush; Mr Sinclair Scott, Burnside; Sir Robert Menzies of Menzies, Bart.; Mr Paterson, Hill of Drip; Sir James H. Gibson-Craig of Riccarton, Bart.; Rev. John Gillespie. *Extraordinary Directors*—Mr Miller of Scrabster; Sir Allan R. Mackenzie of Glenmuick, Bart.; Mr Buttar, Corston; Mr Macduff of Bonhard. *Honorary Secretary*—Sir G. Graham Montgomery of Stalhope, Bart. *Chemist*—Dr A. P. Aitken. *Auditor*—Mr W. Home Cook, C.A. *Engineer*—Mr James D. Park.

The SECRETARY reported apologies for the absence of Sir George Macpherson-Grant of Ballindalloch, Bart.; Mr Forbes of Culloden; Mr Gordon of Newton; Mr Howatson of Glenbuck; Mr Lumsden of Balmadie; Mr Mackenzie, Dalmore; Mr M'Lean, Dunrobin; Mr M'Queen of Crofts; Mr Middleton, Clay of Allan; Major Rose of Kilravock; and Mr Walker, Portlithen.

THE LATE MR ELLIOT OF WOLFELEE.

A letter was read from Mrs Elliot thanking the Directors for their resolution on the death of her husband.

OFFICE-BEARERS.

A letter was read from Mr Pott of Dod accepting office as Ordinary Director for the Border District, in room of Mr J. T. S. Elliot, deceased.

The remainder of the business had reference to the Edinburgh Show, and the programme for the General Meeting.

PROCEEDINGS AT GENERAL MEETINGS.

GENERAL MEETING, 15TH JUNE 1892.

Sir GEORGE MACPHERSON-GRANT, Bart., of Ballindalloch, President, in the chair.

NEW MEMBERS.

Sixty-three new members were elected.

THE NEW SECRETARY.

The CHAIRMAN, on the part of the Directors, intimated that, after very careful consideration of the claims of the candidates for the office of Secretary, they had that morning elected Mr James Macdonald, at present Agricultural Superintendent of the Royal Dublin Society, to the post. The situation would be vacant at the end of the year, and the appointment would come up for confirmation, in terms of the laws, at the January meeting.

BY-LAWS.

Mr GILLESPIE submitted the following by-law, which, in accordance with the resolution of the Directors at their meetings on the 4th May and 1st June, and in conformity with the charter, now falls to be annulled—viz.: "*Agricultural Education, By-law No. 8.*—That five bursaries of £20 each shall be open for competition, the subjects of examination being the ordinary branches of an English education, the method and standard of examination to be determined by the Directors. Each candidate shall make a written declaration before being examined that it is his intention to pursue agriculture as a business. £10 shall be paid to each holder of the bursaries on 1st March, on presentation of a certificate from the professor or teacher that he has regularly attended up to that date, and obtained a certificate of at least 60 per cent in the class examinations, the class of Agriculture in the University of Edinburgh, the Technical College, Glasgow, or such other class as may be approved and sanctioned by the Board of Directors. The remaining £10 shall not be paid unless and until the bursar is awarded the diploma of the Society, either at the close of the session or twelve months thereafter."

It was agreed to annul by-law No. 8.

INVERNESS SHOW.

Sir ALLAN MACKENZIE reported that the dates of the Inverness Show were 26th, 27th, 28th, and 29th July, and that a suitable site for the showyard had been obtained on the farm of Tomnahurich, tenanted by Miss Linton, and in close proximity to where the Show was held on the last occasion the Society visited Inverness, nine years ago. The entries for implements and other articles closed last month. Entries for stock, poultry, and butter will be received up to Monday, 20th June. Post-entries for stock only, taken at double fees up to Wednesday morning, 22d June, at ten o'clock. A subscription in aid of the funds of the Show is being raised in the district, and now amounts to about £1200, and it is to be hoped that before the date of the Show it will exceed the sum subscribed on the last occasion the Society visited Inverness—viz., £1420.

It was remitted to the Directors in the district to nominate a local Committee of Superintendence. The Directors met at Inverness on the 22d April, when the following were selected: *Inverness-shire*—Lord Lovat; Colonel Warrand, Ryefield; Messrs

Macpherson of Belleville; Andrew Dougall, Inverness; M'Beau, Cradlehall; Baillie of Dochfour; Malcolm, Invergarry; Grant, Erchless; Stewart of Ensay; and Macpherson of Corrimony. *Elginshire*—Messrs Walker, Altyre; Stewart, Orbliston; Young, Waterton; Mackessack, yr. of Ardgrye; and Hunter, Dipple. *Nairnshire*—Messrs Robertson, Cawdor; Mather, Delnies; and M'Lennan, Drumore. *Ross-shire*—Sir Hector Munro of Foulis, Bart.; Major Lyon Mackenzie, Braelangwell; Sir A. G. R. Mackenzie of Coul, Bart.; Messrs Inglis of Newmore; Cameron, Balnakeyle; and Arras, Fochlerty. *Caithness-shire*—Messrs Reid Tail, Thurso; and Mackay, Thurso. *Sutherlandshire*—Messrs Dudgeon, Crakaig; Mitchell, Rilbigill; and Sellar, Hartfield. *Orkney and Shetland*—General Burroughs of Rousay. *Town of Inverness*—Sir Henry C. Macandrew; Messrs D. Cameron, Fettes; Urquhart, seedsman; G. J. Campbell, solicitor; and Baillie Elliot. In addition to these, there will be a large deputation of Directors. Sir George Macpherson-Grant of Ballindalloch, Bart., is President of the Society, and Mr Forbes, Culloden, is Convener of the Local Committee.

The different contracts are in the hands of the following parties: *Erection of show-yard*—Mr James Farquhar, Broomhill Place, Aberdeen. *Supply of refreshments in the yard*—Mr Mitchell, 3 India Street, Edinburgh; Mr Brodie, Lothian Street, Edinburgh; Messrs Wilson, 251 Argyle Street, Glasgow, and Perth; and Mr Macbean, Imperial Hotel, Inverness. *Supply of forage*—Mr Walker, Torbreck, Inverness. Sir James Gilson-Craig is managing Director of the Show, and the following have been nominated Showyard Stewards: Sir Allan R. Mackenzie, Bart., for horses; Rev. John Gillespie for cattle; Mr Elliot, Hollybush, for sheep, swine, &c.; Mr Buttar, Corston, for forage; Mr Macduff of Bonhard, for parade stand; Mr Middleton, Clay of Allan, and Mr Glendinning, Hatton Mains, for implements.

At a meeting of Local Directors and Committee of Superintendence, held at Inverness on the 27th May, the question of having a working dairy at the Show having been brought forward, a Committee has been appointed to endeavour to make the necessary arrangements. A hall is to be held on one of the evenings of the meeting, and a Committee has been named to manage it.

A second edition of the prize-list was issued some time ago, from which it will be seen that, owing to the liberality of several members, special prizes are offered to the amount of £420. Tickets for the Show will be sent in the course of next month to all members residing in the United Kingdom whose addresses are known. During the Show, the headquarters of the Society will, as usual, be at the Caledonian Hotel, Inverness.

He also intimated that it was proposed to hold the Show of 1893 at Edinburgh, and that of 1894 at Aberdeen.

The report was approved.

THE MICE PLAGUE.

Rev. JOHN GILLESPIE gave in a formal report with regard to the steps taken with reference to the mice plague. He had really nothing additional to report except what was known through the usual sources of information. As they knew, a Committee had been appointed, had met once, and was to meet at three different centres next week, and he assured them that every step would be taken to deal with the matter in as exhaustive and satisfactory a manner as possible.

GOVERNMENT GRANT FOR EXPERIMENTS.

The SECRETARY reported that last year the Society had received £200 of a grant from the Board of Agriculture for agricultural experiments. This year they had applied for and hoped to obtain a larger sum, in consideration of the work that was being overtaken by the Society.

FORESTRY CHAIR ENDOWMENT.

Sir ROBERT MENZIES reported on the scheme for the endowment of a Forestry Chair in Edinburgh. The fund, he said, now amounted to £2700, which still left them £3200 to raise before they got the endowment from the Government. That was a comparatively small sum for Scotland to raise, considering the importance of the subject. Colonel Bailey's lectures given last winter had, he understood, been very successful. There was an attendance of forty at the class; and now that they had got a lecturer and a class, he hoped they would soon get the money to endow the Chair. They were to hold a meeting soon with the Royal Scottish Arboricultural Society to concert measures for raising the money.

Dr OLEGHORN, in support of the remarks of the Convener, said that the Highland Society and the Arboricultural Society were working harmoniously together. There had been a slowness in the money coming in, but that did not indicate indifference so much as ignorance of the importance of the subject. He attended many of

Colonel Bailey's lectures, which were admirable. They must press forward the scheme.

Later on, Sir ROBERT MENZIES said that at the Forestry examinations of the Society two candidates presented themselves, and both stuck.

REPORT BY CHEMIST.

Dr AITKEN said: I have to report the continued activity and increase of the local associations, who are carrying on field experiments under the guidance of the Chemical Committee of the Society. The experiments going on this summer are modifications of those of last year, and they are being carried out in ten different counties of Scotland.

The accurate dairy record made on ten farms in Ayrshire last summer was much appreciated by those who took part in it; but it was felt that as the season had been most unfavourable owing to low temperature and prolonged drought, it would be misleading to publish the results until the results of another and more favourable season were obtained. Accordingly the experiment has been resumed this summer. The milk of all the selected cows is being weighed morning and evening, and samples sent regularly to the laboratory for analysis.

Owing to the prevalence of frost at Pumpherston, it was found inexpedient to apply the manures to the grass-plots until 17th May. Thanks, however, to the recent warm and wet weather, the plots on the station are in a forward state, and there is good reason to anticipate a very successful season.

The Chemical Committee has now under consideration experiments on a larger scale than hitherto undertaken, to discover the best method of improving pasture and other kinds of grass; also to discover the best means of growing clover. These and other experiments will be commenced this summer.

The system the Society has been pursuing during the last ten years to suppress the sale of adulterated and deficient manures has been communicated to the Government by means of evidence led before a departmental committee appointed to collect information regarding the adulteration of manures and feeding-stuffs with a view to legislation.

A short summary of the Society's schemes for the promotion of agricultural education by means of experiments was also presented to the Board of Agriculture a few weeks ago.

BOTANICAL REPORT.

Mr A. N. M'ALPINE said: During this season a fairly large number of seeds have passed through my hands.

The clovers are, as a rule, considerably below the average—white and Alsike especially so. The seed-skin when abnormally thick causes slow and prolonged germination. The embryo, too, shows inherent weakness, rotting away (during or after the period of germination. The percentage of seeds which do not swell and remain hard (hard seeds) is often high. These are the main causes of the low percentage of growth in clover seeds of this season.

The grass seeds are often poor and slow to germinate, the growths which spring from them wanting in vigour and robustness. Disease and chaff are prevalent. These features are most conspicuous in Italians, and frequently in perennial ryegrass. Cocksfoot is usually below average. A sample of hard fescue reached me marked sheep's fescue. Tall fescue has been true to name, the New Zealand substitute having evidently gone out of the market.

The following are the maximum and minimum percentages of growth and purity of samples tested:—

CLOVERS.	Germination.		Purity.	
	Max.	Min.	Max.	Min.
Red and cow grass	99	70	100	92
White	92	62	99	91
Alsike	92	60	100	90
Trefoil and yellow clover . .	98	82	100	95
GRASSES.				
Permanent ryegrass	96	62	100	93
Italian ryegrass	92	57	100	95
Cocksfoot	92	55	100	96
Meadow fescue	97	87	100	96
Tall fescue	84	70	98	96
Hard fescue	92	53	100	96
Sheep's fescue	91	82	100	97
Timothy	100	87	100	97
Meadow foxtail	82	35	97	89

AGRICULTURAL EDUCATION.

The Rev. JOHN GILLESPIE, Mouswald, reported that the annual examination of candidates for the Society's diploma and certificate in Agriculture was held on the 23d, 24th, and 25th March. The number of candidates who presented themselves was twenty-nine. The examination resulted in seven passing for the diploma, and seven for the first-class certificate—viz.:

For Diploma—John Campbell, Clenchaide, Lockerbie; James L. Duncan, Birgisdale, Knock, Rothesay; James Wilson, jun., West Mains, Dolphinton; William Wilson, Goodyhills, Maryport; Robert Blyth Greig, Balcurvie, Windygates, Fife; Louis C. Seheult, Santa Rosa, Arima, Trinidad; F. O. Solomon, North-Eastern County School, Barnard Castle.

For Certificate—Patrick A. Bell, Auchtertyre, Newtyle, Coupar-Angus; Ernest Clayton, Grimston Park, Tadcaster, Yorks; James D. Duin, Easthouse Farm, Seaham Harbour; Thomas Parker Greenwood, Amington House, Tamworth; James Hutton, Benegal, Milnathort; Joseph T. de la Mothe, Agricultural College, Aspatia; Robert S. Seton, Rampyards, Watten, Caithness.

At a meeting of the Council on Education, held on the 2d March, Professor Wright, Glasgow, was appointed Examiner in the Science and Practice of Agriculture, in place of the late Mr John Munro of Kinloss.

Mr GILLESPIE also announced that the £10 given in books to the class of Agriculture in the University of Edinburgh had this year been equally divided, as follows: (1) Marcus C. Wood, Midhouse, Kirkwall; (2) Robert Affleck, Castle-Douglas; (3) James L. Duncan, Knock Farm, Rothesay.

The Report was approved.

FORESTRY DEPARTMENT.

Sir ROBERT MENZIES reported that the Forestry examinations were held on the same day as those under the Agricultural Education Charter, when two candidates presented themselves, both of whom failed to pass.

At a meeting of the Forestry Committee, held on the 9th of March last, Colonel Bailey, Lecturer on Forestry, Edinburgh University; Dr Somerville, Durham College of Science, Newcastle-on-Tyne; Mr Lewis Bayne, forester, Scone; and Mr James Kay, forester, Bute, were appointed Examiners in the Science and Practice of Forestry.

The Report was approved.

GENERAL MEETING IN THE SHOWYARD AT INVERNESS,
27TH JULY 1892.

A General Meeting of members of the Society was held in the pavilion in the show-yard at noon. Sir GEORGE MACPHERSON-GHANT of Ballindalloch, President of the Society, occupied the chair, and among others present were Sir Kenneth Mackenzie of Gairloch; Sir Alex. Muir Mackenzie of Delvine; Mr Forbes of Culloden; The Mackintosh of Mackintosh; Mr Cameron of Lochiel; Sir James Gibson Maitland; Sir Kenneth Mathieson of Lochalsh; Sir Arthur Mackenzie of Coull; Mr Macpherson Grant of Drumduan; Major Rose of Kilravock; Mr J. M. Martin of Auchendennan; the Rev. John Gillespie; Mr Howatson of Glenbuck; Mr Smith, Strathcowan; Mr Ford, Fentonbarns; Mr Mackintosh of Holme; Mr Lockhart, Airies; Mr Peterkin, Dunglass; Mr Stewart, Emsay; Mr Malcolm, Invergarry; Mr Sinclair Scott; Mr Elliot, Hindhope; Mr W. H. Dunlop, Doonside, Ayr; Mr James Archibald, Over-shiels; Major Kemble, Knock, Skye; and Mr Stirling of Fairburn.

The CHAIRMAN apologised for the absence of Sir James Gibson-Craig, who had been unable to attend the meeting in consequence of the delay of the ship in which he was returning from Australia. A visit of the Society to any town or district was, Sir George said, a matter of great importance, and the reception accorded to it was of great consequence to the Society. Favoured as they had been with cordial and hearty receptions on all previous occasions, he did not think they had ever been better received than they had been in the good city of Inverness. He moved that the thanks of the Society be awarded to the Provost, Magistrates, and Town Council for their kind co-operation in securing the success of the Show.

Mr CAMERON of Lochiel seconded the motion, which was cordially agreed to.

VOTES OF THANKS.

Mr MARTIN of Auchendennan moved a vote of thanks to the District Committee, and said that with a quarter of a century's experience of the Society's Shows, he had never seen the local arrangements more satisfactory, and the Society had never been more hospitably entertained.

Mr RALSTON, Culmore, seconded the motion, which was carried unanimously.

Mr FORBES of Culloden, whose name was coupled with the vote, returned thanks, and said they could not have obtained a more suitable site for the Show. On the last occasion of the Society's visit to Inverness they had to use planks in order to be conveyed from one part of the yard to another, but this year everything promised well so far as the weather was concerned, and there was little likelihood of their being troubled in that way.

The Rev. JOHN GILLESPIE, in moving a vote of thanks to the collectors and subscribers to the Show fund, said that under the old method the money was raised through the Commissioners of Supply by voluntary assessment. That body had now disappeared, but the funds were being provided satisfactorily by voluntary subscription, and the result in the north had been very gratifying. He hoped that other districts visited by the Society would emulate them, for wealthy as the Society was, it was necessary that its funds should be supplemented in that way.

Mr ELLIOT, Hindhope, seconded the motion, which was agreed to.

Sir JAMES GIBSON MAITLAND, in moving a vote of thanks to the Chairman, said they had only to look round the showyard to see how successful he had been as a breeder, and they knew his success as a chairman.

Mr FORD, Fentonbarns, seconded the motion, which was adopted.

The CHAIRMAN, in returning thanks, said the presidency of the Highland Society was no mean honour, and from an agricultural point of view he considered it the greatest honour that had ever been conferred upon him. It had been interesting also in this respect, that forty-six years ago, when the Society visited Inverness, his father occupied the place of Culloden as chairman of the local committee.

BURSARIES.

The Rev. JOHN GILLESPIE said that at the half-yearly General Meeting of the Society held last month the members agreed to cancel the by-law of the Society relating to bursaries, and the Directors had come to the conclusion that the time had come when the Society should cease to give money for bursaries, their decision being arrived at mainly on the ground that a very considerable sum of money was now in the hands of the County Councils to be applied to technical education, and might be expected eventually, if not immediately, to be made available for that purpose throughout the country. A further reason was that County Councils, or technical instruction committees in particular districts, would be better able than a central body like the Directors of the Highland Society to select suitable bursars. He hoped that all interested in the subject would, however, do their best to promote the object in view. He mentioned as an example of what he had seen in the way of awarding bursaries, that on one occasion a gentleman who had passed a most successful examination had asked that the date of his attendance at the University classes should be postponed for fifteen months, on the ground that, being a commercial traveller, it would be inconvenient for him to attend before that time. He moved the confirmation of the resolution passed at the June meeting, which was agreed to.

VOTE OF THANKS TO REV. DR N. MACLEOD.

Mr HOWATSON of Glenbuck moved a vote of thanks to the Rev. Dr Norman Macleod for conducting the service in the showyard on Sunday. That was, he said, the first occasion on which such a service had been held, and he hoped it would be continued.

Mr MACDUFF of Bonhard seconded the motion, which was agreed to.

VOTE OF THANKS TO MR CHAPLIN.

The CHAIRMAN said he would not like them to separate without awarding to Mr Chaplin, of the Board of Agriculture, a vote of thanks for their vigorous and very successful effort in stamping out cattle disease. They might have trodden on some people's corns in carrying out the regulations, but he was sure they would all be agreed that the announcement which he could now make, that the country was free from disease, was one peculiarly gratifying.

ANNIVERSARY GENERAL MEETING, 18TH JANUARY 1893.

Mr MARTIN of Auchendennan, Vice-President, in the chair.

NEW MEMBERS.

Sixty-one new members were elected.

The SECRETARY read a letter from Sir George Macpherson-Grant, Bart., expressing regret at being unable to be present, and referring to the pleasure his year of office as President had given him.

It was unanimously resolved—"That Sir George Macpherson-Grant, Bart., having presided over the Highland and Agricultural Society during the past year, the thanks of the Society are eminently due to him for the zeal which he has manifested in promoting its efficiency and prosperity, for presiding at the General Meeting of members held at Inverness on the occasion of the General Show there, and for the great interest he has always taken in the Society."

OFFICE-BEARERS FOR 1893.

The following noblemen and gentlemen were elected to fill up the vacancies in the list of office-bearers: *President*—His Royal Highness the Duke of York, K.G. *Vice-Presidents*—The Earl of Rosebery, K.G.; the Earl of Dalkeith; Lord Polwarth; Duncan Forbes of Culloden. *Ordinary Directors*—John Speir, Newton Farm; George Dun, Easter Kincaid; Sir James R. G. Maitland of Barnton, Bart.; James J. Davidson, Saughton Mains; W. H. Lumsden of Balmie; Andrew Lusk, Lochvale; C. Macpherson Grant of Drumduan; John Scott Dudgeon, Longnewton; and Gideon Pott of Dod, in room of Mr Elliot of Wolfelee, deceased. *Extraordinary Directors*—The Earl of Wemyss and March; the Right Hon. James Alexander Russell, Lord Provost of Edinburgh; Sir Thomas D. Gibson Carmichael of Skirling, Bart.; Robert Dundas of Arncliffe; Captain Thomas Hope of Bridge Castle; William Ford, Fenton-barns; James Hope, East Barns; Alexander Glendinning, New Mains; Henry Callender of Preston Hall; Baillie Walcott, Edinburgh; Sir Allan Mackenzie of Glenmuick, Bart.; Captain G. D. Clayhills Henderson of Invergowrie, R.N.; David Buttar, Corston; Alexander Murdoch, Gartcaig; Andrew Mackenzie, Dalmore; Alexander Macduff of Bonhard; John M. Martin of Auchendennan; Charles Howatson of Glenbuck; R. Shirra Gibb, Boon; John Ballingall, Dunbog. *Secretary*—James Macdonald.

Mr MACLELLAN, Glasgow, asked if they were in order in electing Extraordinary Directors in successive years, as he understood that the office was only a yearly one.

The CHAIRMAN explained that there was no rule limiting the election of Directors, and that they were elected according to their services to agriculture.

ACCOUNTS FOR 1891-92.

Sir GRAHAM MONTGOMERY, Bart., submitted the accounts of the Society for 1891-92, which showed that the income for the year was £4679, 8s., and the expenditure £5732, 3s. 2d., leaving a balance at debit of the Society for the year of £1052, 16s. 2d. This balance of expenditure entirely arose from the loss on the Inverness Show, amounting to £1088, 17s. 11d.

In conformity with the charter, and in accordance with the recommendation of the Directors, he now asked the permission of the meeting to uplift a portion of the Society's capital—viz., £492, 11s.—and apply it in reducing its overdraft with the Royal Bank, amounting to £1575, 3s. 3d.

The £492, 11s. of the Society's capital referred to is part of £2000 paid up by the Clyde Navigation Trust, the remainder having been used in the payment of £500 of the new stock of the British Linen Company Bank, to which the Society had become entitled.

In presenting the above report, Sir GRAHAM said the Directors regretted very much that they had not a more favourable statement to submit to the meeting, the loss on the Inverness Show having been considerable. That was the main reason the deficit was so heavy. They could only hope that the forthcoming Show to be held in the capital of Scotland would be favoured with fine weather, and he could not help thinking that his Royal Highness the Duke of York, if he should visit the Show in person, would lend an additional attraction, and that the receipts may go far to make up for the present deficit.

Mr Cowe, Balhousie, said he thought it must be a very painful duty to move the adoption of a report of the kind. It was a very painful thing indeed to members to see such a loss year after year incurred by the Society. Last year they were told by

Sir James Gibson-Craig that a Committee had been appointed to investigate the management of the Society. The report of that Committee was now in their hands, but unfortunately members had only got it since they came into the room, and they consequently had no time to go into the details of it. If, however, it was the fact that the forage bill at Inverness had increased nearly double the amount it usually was, he thought members were entitled to some explanation on the point. Then there was another point to which he desired to call attention. He meant Dr Aitken's report, which seemed to involve a larger sum every year. The amount was £814, 14s. 1d. this year. In that sum there was a small item of £29 for some experimental stations. It was said that every man had a soft place in his head, and he believed the Directors had a soft place in regard to these experimental stations. He thought the Directors had a favourite child, and that child's name he would call "Dr Pumpherson." He would just like to ask what the Directors were doing for the advancement of agriculture by spending that money on experimental stations. The Directors had for the last two or three years been spending a sum of £29, and they had nothing to show for it.

Sir JAMES H. GIBSON-CRAIG said he could offer an explanation on two of the points raised by Mr Cowe. As to that dealing with the fodder bill at Inverness, Mr Cowe was slightly out of order—that matter would come up when the report on the Inverness show was submitted. As to his other point, Sir James remarked that, as not unfrequently happened with critics, Mr Cowe had only looked at one side of the accounts. He would find, on looking at the other side, that the increased expenditure had arisen from a sum of £100 granted by Government specially in aid of agricultural experiments, which had had the effect, of course, of increasing their chemical bill. The £200 had been given for a special purpose, and the Directors were bound to expend it in that way. As a matter of fact, the Directors had spent £219 on that matter. Sir James concluded by seconding the adoption of the accounts, and the motion was agreed to.

THE ARGYLL NAVAL FUND.

Sir ROBERT MENZIES submitted the accounts of the Argyll Naval Fund for 1891-92, which showed that the income for the year amounted to £243, 4s. 7d., from which five recipients received each an allowance of £40, making the total expenditure £200. A vacancy had occurred in the list of recipients by the promotion of Mr Edward A. Baird, and the Committee had under consideration a list of eligible candidates from which to fill the vacancy.

THE INVERNESS SHOW.

Sir JAMES H. GIBSON-CRAIG, Convener of the Committee on General Shows, reported the results of the General Show held at Inverness in July last. In all respects except one that Show had been a marked success. The display of live stock and implements was fairly large, and, as to general merit, had rarely been excelled. Unfortunately, as to its financial results, the Show was sadly disappointing. When the accounts had been finally adjusted, some local subscriptions being still unpaid, it would be found that the net loss on the Show would be about £1000. That heavy loss arose entirely from two items in the account—from a decrease, as compared with the Inverness Show of 1883, of no less than £449 in the local subscriptions, and by a very heavy bill (£531) for forage and bedding. In 1883 the local contributions to the funds of the Show amounted to £1462; last year they fell to £1013. The large amount of the fodder bill had exercised the serious attention of the Directors. A special Committee was appointed to investigate the matter, and after full inquiry they reported to the effect that the excess in the outlay was partly due to the fact that, owing to the unfavourable season for growth, the bunches of green food were shorter than was expected, and partly to the fact that the system of giving green food to the herdsmen without limit led to considerable waste. With the view of preventing a similar occurrence in future, the Committee recommended that the old system of giving a limited quantity of green food be revived, and that forage for five days be given free, any further supplies required by exhibitors to be paid for. These recommendations the Directors had adopted for the Edinburgh Show. In moving the adoption of the report, Sir James Gibson-Craig said that when the Show was held in the extremities of the country they must expect a loss. They could not draw the same amount of money at Inverness as at Edinburgh or Glasgow. Another great difficulty was that in the old days of the Commissioners of Supply they had a voluntary assessment laid on, while now they had to go round with the hat, and take what they could get, the consequence being that in the Inverness district they were £450 short of what they received before. Recently they had come to a resolution that in future the show-place should be nominated two years ahead, and unless the local subscriptions were satisfactory in a particular district they would not go there. He hoped that in that way they would soon be able to make both ends meet, as they used to do.

Mr MACDUFF of Bonhard seconded the motion.

Mr FYSHE, Markinch, expressed himself dissatisfied with the explanation given regarding the fodder bill.

Sir JAMES GIBSON-CRAIG said it was a very dry spring, and as they bought the fodder in bunches they did not get so large a quantity.

Mr FYSHE—Why should the contract not be by weight?

Sir JAMES GIBSON-CRAIG—I don't like to make any imputations, but it might be a wet morning.

Mr FYSHE moved that the accounts be placed in the hands of the members along with the notice calling the meeting; but Mr GILMOUR of Montrave and Colonel STIRLING of Kippendavie said this would entail great expense. In the end the CHAIRMAN read from the by-laws to show that notice of the motion was required to be given, and it was ruled out of order.

THE EDINBURGH SHOW OF 1893.

Sir JAMES H. GIBSON-CRAIG reported the arrangements for the General Show of this year, which is to be held in the Dean Park, Edinburgh, on the 25th of July and three following days. His Royal Highness the Duke of York, who had graciously accepted the presidency of the Society for 1893, hoped to be able to attend the Show, and it need hardly be said that the presence of his Royal Highness would afford much gratification, not only to the Directors and other members of the Society, but also to the people of Scotland generally. The prizes offered by the Society this year would amount to nearly £2000, and from other sources over £400.

The Rev. J. GILLESPIE made a special appeal to the city of Edinburgh to give a liberal response to the request for subscriptions in aid of the Show. He did not refer to the Corporation of Edinburgh, from whom they might expect a grant, but to those professional gentlemen who drew large incomes from the management of estates, and who were the only class connected with land who were prosperous just now. He believed that in the past those gentlemen had not had an opportunity of giving voluntary subscriptions, and he trusted they would now come forward, and, by raising a handsome sum, set an example to the other districts.

Mr JOHN HENDERSON, C.A., suggested that it should also be made known that the Society were willing to receive donations of special prizes.

Sir JAMES H. GIBSON-CRAIG said they must give up the National Show unless they could get local subscriptions. It was evident that it was much preferable that the Directors should have in their own hands the money subscribed, in order that they might spend it for the benefit of the Show as the Directors saw fit, rather than that they should be hampered by personal desires. The premium list was prepared and issued early in the year, and those who wished to give special prizes would then see what "specials" the Directors had provided for.

The report was adopted after some further conversation.

THE GRANT TO KILMARNOCK CHEESE SHOW.

Mr BUTTAR, Corston, presented the report on district competitions and cottages and gardens, showing that in 1892 the Society's money premiums and medals had been granted to 240 districts, making the total sum awarded £250. For the current year the Directors proposed the following grants—viz.: Nine districts for grants of £12 each for horses, cattle, and sheep; six districts for grants of £15 each for stallions; one district for a special grant of £5, and five districts of £3 each; twenty-four districts for two medals each, and 180 medals at ploughing competitions. For cottages and gardens: Two parishes at £3 each, and sixteen parishes at two medals each; two gold medals of the value of £10 each, for the erection and improvement of cottages,—making the total sum offered about £300. The Directors reported that they were unable to recommend the continuance of the grant of £20 to the Kilmarnock Cheese Show. In submitting the report, Mr Buttar said the Committee of Directors had given the matter of the grant to Kilmarnock Cheese Show much attention, and they regretted that they were under the necessity of recommending its withdrawal. Looking to the state of the Society's finances, and to the number of applications for grants from local societies more in need of a grant than was Kilmarnock Cheese Show, and considering also that the Directors this year had voted £60 to the Kilmarnock Dairy School, the Directors felt that they would be doing an injustice to some of the other applicants for grants if they refused their applications and granted the one in question, more especially in view of the fact that the Kilmarnock Cheese Show was now a most flourishing institution. He moved approval of the report.

Mr FISHER, Jellyholm, seconded the motion.

Mr HAMILTON, Cairnhill, Kilmarnock, moved as an amendment that the grant of £20 to the Kilmarnock Cheese Show should be continued. He expressed the hope that

the majority in favour of his proposal would be even larger than it was at the last annual meeting. The Directors appeared to think that the Kilmarnock Cheese Show was a very flourishing affair, but if it was flourishing that was due to the grants they had received in the past and to local exertion. If there were any present who had not read the article in that morning's 'Scotsman' on the subject, they would do well to read it, for it was a far better and abler exposition of the position of those who favoured the grant than he could give. He would only submit that the present was a very inopportune time at which to withdraw the grant, because now the dairy industry in Scotland was in a most critical state, owing to foreign competition and importations.

The EARL OF STAIR, in seconding the amendment, said he would like to draw the attention of all members to the 'Scotsman' article to which Mr Hamilton had referred, because it was, in his opinion, the most convincing article that ever was written. They had every reason to congratulate themselves that the matter had been taken up by the 'Scotsman.' His Lordship went on to say that that morning he had received a circular asking him, as a proprietor in Mid-Lothian, to subscribe to the Edinburgh Show of the Society this year. He would be very happy to subscribe, but his subscription would depend very much on the decision of the meeting on that question.

Mr J. H. TURNER, Kilmarnock, supported the amendment, and hinted that if the grant was withdrawn the members of the Highland Society in the west might have to seriously consider whether they should not hive off from the Society altogether. If they in the west of Scotland were to give £500 every year to the funds of the Highland Society, surely they were deserving of some consideration and recognition at its hands.

Colonel STIRLING of Kippendavie said the speakers who had referred to the 'Scotsman' article had entirely left out of sight the four or five opening sentences, in which it was said that it was the duty of the Highland Society Directors to do their very best to reduce the expenditure. He would just point out that neither the 'Scotsman' nor Mr Hamilton had taken the trouble to show how these grants were to be continued, and the expenditure at the same time reduced, unless the Society drew year after year from its capital. Continuing, Colonel Stirling said he did not suppose any one would deprecate the Kilmarnock Cheese Show or the Ayrshire Agricultural Show, but at the same time they could not take the "breeks aff a Hielandman"; and if the Directors had not sufficient funds to provide grants to Shows such as the Kilmarnock Show, he did not see that it was fair to the Board to ask them to find the money. If they did give the grant, it would have to be out of the capital of the Society.

The Rev. JOHN GILLESPIE, Mouswald, as one of the minority in the Board, said he had a high sense of the usefulness of the General Show of the Society, but he had also had ample opportunities of knowing the good such grants as they had under consideration did to district societies, and he was not quite sure if the grants to district societies did not do more good than the big Show of the Society did.

Colonel STIRLING—Give up the big Show altogether, then.

Mr GILLESPIE—No, I don't say that. Let us try and hold the balance fairly between the General Show of the Society and the district societies. Mr Gillespie added that another reason why he supported the amendment was that the Kilmarnock grant was the only grant given for the encouragement of the regular and systematic testing of dairy produce in Scotland.

Mr GILMOUR of Montrave, supporting the recommendation of the Directors, said he regretted to see feeling imparted to the discussion—feeling almost amounting to a threat on the part of west of Scotland members as to their future action were a paltry sum of £20 withdrawn. He said paltry, for he thought £20 was a paltry sum when the Ayrshire Agricultural Society was concerned. A society like the Ayrshire Society might easily find £20 without coming there and holding out threats over the heads of the Highland Society.

Sir JAMES H. GIBSON-CRAIG proposed as a compromise that they should grant the £20 to the Kilmarnock Cheese Show for the year, and reduce the total amount to be devoted during 1893 to dairy education to £80.

Major WARDLAW RAMSAY seconded this proposition.

In order, however, that a direct vote might be taken on the proposal, Sir James H. Gibson-Craig withdrew his amendment. On the amendment of Mr Hamilton to continue the grant of £20 being put against the recommendation of the Directors, the former was carried by a large majority.

THE FORESTRY DEPARTMENT.

Sir ROBERT MENZIES reported that they had now a sum of close upon £2500 available for the endowment of the Chair of Forestry in Edinburgh University. He hoped they would soon have raised the £5000 necessary to entitle them to the grant of a similar sum promised from the Treasury. In the meantime he moved that a grant of £50 be given in aid of the Chair until the completion of the endowment.

Dr CLEGHORN of Stravithie seconded the motion.

Mr COWE, Balhousie, moved the previous question, on the ground that the finances of the Society were not at present in a position to bear this additional burden.

Mr FYSHE, Markinch, seconded the amendment; but on a vote being taken the grant was agreed to, only the mover and seconder voting for the amendment.

THE INVENTOR OF STEAM-PLOUGHING TACKLE.

The MASTER OF POLWARTH drew attention to the case of Mr Fiske, the inventor of steam-ploughing tackle, who in his old age was in very ill health and reduced circumstances, depending for support on the pittance which a daughter could earn. He had in his day spent a great deal of money, time, and labour in furthering what appeared to be a very promising invention. The Society was not able to vote any money from their funds, but the Directors had opened a subscription-list, and they invited the assistance of members and implement-makers throughout the country. The Directors had also recommended Mr Fiske's claims to a grant from the Civil List.

AGRICULTURAL EDUCATION.

The Rev. JOHN GILLESPIE reported that the examination of candidates for the Society's Agricultural Certificate and Diploma had been fixed to be held on the 22d, 23d, and 24th March, candidates being required to lodge intimation before the 15th March.

RAILWAY RATES.

The Rev. J. GILLESPIE reported that the Directors had joined with other societies in a representation to the general managers of railways as to their order withdrawing the privilege of free passes to attendants travelling in charge of stock, and they had promised to reconsider their decision as affecting the attendants on animals going to and returning from live-stock shows. Proceeding to refer to the action of the railway companies in adding to the actual charges for the conveyance of farm produce, Mr Gillespie said that in taking that step the companies had broken faith with the public generally and with the Duke of Richmond's Commission, which had practically settled the question. The railway companies, instead of acting on the principle of live and let live, were shaping their policy in such a way that agriculturists would not be able to live. Taking a distance of twelve miles, there was an increase in the charges of 52 per cent for 1-ton lots, and of 25 per cent for 2-ton lots; for seventeen miles the increase for the same quantities was 30 per cent and 10 per cent respectively; for sixty-one miles the increase was 20 per cent and 2½ per cent; and for eighty-five miles the increase was 20 per cent and 3·3 per cent. He wished to point out how extremely hard these rates bore on men sending their produce short distances and in comparatively small quantities, which was the case with the great body of practical agriculturists in Scotland, and they were particularly hard hit by these new rates. The only explanation he had seen of the present position taken up by the railway companies was from Sir Henry Oakley, who had expressed the view that the new rates were only the ordinary rates, and that in course of time special rates would be given for special classes of goods. For his part, Mr Gillespie said, he had no expectation that the special rates would give any considerable redress, because they might expect that the special rates would be increased, in comparison with the former special rates, in something like the same proportion that the ordinary rates had been increased over the former ordinary rates. But, further, special rates would only give relief to big traders who were in a position to protect themselves, and would give no relief to the general body of agriculturists in the country. He advised them to flood the Board of Trade with representations showing the true state of the case, and also to button-hole their members of Parliament on the subject, for that was a matter which in these days of agricultural depression affected the farmers' very living.

The MASTER OF POLWARTH indorsed Mr Gillespie's remarks, and suggested, as another course to those suggested by him, that they ought to try to threaten the railway companies with opposition wherever that was possible, so as to induce them to give better terms.

After some further conversation, it was agreed, on the motion of Mr COWE, seconded by Sir ALEXANDER KINLOCH of Gilmerton, to petition the Board of Trade on the subject, the terms of the petition being left with the Directors.

CHEMICAL DEPARTMENT.

Dr AITKEN presented the following report:—

Grass Experiments.—At no time in the history of British agriculture has the subject of pasture improvement attained the importance it has at the present day. A large proportion of the land which it has been found profitable to break up, and keep under rotation during the last fifty years, must now be put under permanent pasture;

for the large supplies of agricultural produce coming into the country from abroad have rendered the cultivation of poor land unprofitable. Year by year the proportion of land under grass is increasing, and will increase, and the difficulty of getting a good sole of grass upon light land will be much felt for many years to come. Not the least of the difficulties lies in discovering the kind of manurial treatment most favourable to the production and maintenance of good grass, and this subject has been receiving the attention of the Chemical Committee. Three experiments have been devised for the manurial treatment of pasture and permanent meadow, such as will yield general information on the subject, and also special information to those in the districts where they are to be tried. The experiments are to last for four years, and as the expense involved is very considerable, it has been resolved to limit their number to twenty-one per annum. Should any member of the Society desire to make the experiments on his own account, I shall be pleased to supply him with the requisite schedules, and all requisite information. Besides pasture experiments, the Committee has prepared an experiment for the improvement of rotation grass, and another to determine the most economical way of manuring beans, peas, and vetches. The schedules containing instruction for carrying out these will be supplied to all members or associations who desire to carry them out in accordance with the regulations of the Committee, and the manures for them will be provided by the Society.

The attention of the Committee having been drawn to the occurrence of considerable discrepancies in the estimation of oil by different chemists in their analyses of cakes and feeding-stuffs, I was asked to investigate the matter, and suggest a method whereby accurate results might be obtained. This I have done, and have devised suitable apparatus, which will be described in the 'Transactions.'

Analytical Associations.—The number of associations which have sent in their returns of analyses and claims for the Society's grant is less this year than usual. A marked decrease in the number of manures and feeding-stuffs analysed is noticeable in several instances. On the other hand, there are three associations which are more active and efficient than ever—viz., those of Western Ross, Nairnshire, and Strathearn. The number of analyses for which grants are allowed for last season is 182, and the total amount of the grant is £72, 15s.

I am glad to be able to report that the number of manures purchased by members of the associations that have been found inferior to the guarantees to any material extent is only four, and that these are, with perhaps one exception, capable of easy and satisfactory explanation. On the other hand, the great majority of the samples analysed for the associations have been found better than their guarantees.

At this stage the Chairman pointed out that, as there was not a quorum present, the proceedings must terminate.

BOTANICAL DEPARTMENT.

The following report by the BOTANIST was handed to the Secretary and laid on the table:—

Mr M'ALPINE said: I have the honour to report in a general way regarding the commercial seed at present in our markets.

The old seed has been cleared out, and therefore the price is, as a rule, high. The stocks of red clover in America were, for example, so exhausted that for the summer and autumn sowing reimportation of red seed from this country was necessary.

Red clover.—The seed is usually good. English red is very scarce, therefore in purchasing see that you get it. *White clover* is good but very scarce. *Alsike* is usually of better quality than last year. Inferior seed may be adulterated with small trefoil seed. *Perennial ryegrass.*—There has rarely been less in the markets than now. It is usually lighter than last year. Light qualities don't grow well. *Italian ryegrass.*—Usually lighter than last year. Foreign Italian is remarkably scarce, and therefore dear. Purchasers of foreign Italian must be especially careful, as the temptation to substitute home Italian is great. The extremely dry summer in France is the chief cause of the scarcity, but although quantity has been diminished the quality is high. *Cocksfoot* is fairly plentiful and of good growth. *Timothy* is of good quality, but dearer than last year. *Crested dogtail* is abnormally dear, because of the wet weather which prevailed in collecting districts. *Turnip seed* is very scarce and dear. The old stocks have been used up.

ESSAYS AND REPORTS.

The following report by the Rev. JOHN GILLESPIE, Convener of the Committee on Publications, was laid on the table:—

Premiums awarded for Reports.

£10 to J. Nisbet, 145 Norwich Road, Ipswich, for a report on the Black Arch Nun or Spruce Moth.

£5 to J. Cochrane, Glenside, Hetton-le-Hole, Fence Houses, Durham, for a report on the Cultivation of Osiers.

£5 to John Blaikie Webster, 100 West Graham Street, Garnethill, Glasgow, for a report on the more extended introduction of Hardy, Useful, or Ornamental Trees which have not hitherto been generally cultivated in Scotland.

£5 to A. C. Forbes, Bowood, Calne, Wilts, for a report on the Elm-Bark Beetle.

The forthcoming volume of the 'Transactions' would contain, besides the above-mentioned essays, reports on the following subjects:—

Methods of Rearing and Feeding Cattle in the North of Scotland. By Mr James Black, Elgin.

Sheep on Arable Land. By Mr W. Sutherland, The Peel, Tibbermuir.

An Ayrshire Dairy Farm, a year's work thereon. By the Rev. John Gillespie, Mouswald.

Selection and Care of Farm Implements. By Mr P. M'Connell, Ongar Park Farm, Essex.

Farm Fences. By Mr Thomas Dykes, Bent Farm, Lesmahagow.

Depth at which Grass Seeds should be Sown. By Mr John Speir, Newton Farm.

Natural Regeneration of Scots Fir Woods. By Mr A. C. Forbes.

The 'Transactions' will also contain a list of the premiums awarded in 1892, those offered in 1893, together with the usual reports of the meetings, and the list of members corrected up to date.

PREMIUMS AWARDED BY THE SOCIETY IN 1892.

I.—REPORTS.

1. J. Nisbet, 145 Norwich Road, Ipswich, for a Report on the Black Arch Nun or Spruce Moth	£10 0 0
2. J. Cochrane, Glenside, Hetton-le-Hole, Fence Houses, Durham, for a Report on the Cultivation of Osiers	5 0 0
3. John Blaikie Webster, 100 West Graham Street, Garnethill, Glasgow, for a Report on the more extended introduction of Hardy, Useful, or Ornamental Trees which have not hitherto been generally cultivated in Scotland	5 0 0
4. A. C. Forbes, Bowood, Calne, Wilts, for a Report on the Elm-Bark Beetle	5 0 0
	<hr/> £25 0 0

II.—INVERNESS SHOW, 1892.

ABBREVIATIONS.—V. H. C., *Very Highly Commended*. H. C., *Highly Commended*. C., *Commended*.

CLASS I.—CATTLE.

SHORTHORN.

<i>Best Bull.</i> Given by Mr Inglis of Newmore—William Duthie, Collynie, Tarves, "Master of the Realm" (59,459)	£10 0 0
<i>Breeder of Best Bull.</i> Amos Cruikshank, Sittyton, Aberdeen, "Master of the Realm" (59,459). Silver Medal	0 14 0

SECTION 1. BULL, calved before 1st January 1890.

1. William Duthie, Collynie, Tarves, "Master of the Realm" (59,459)	15 0 0
2. Horatio R. Macrae of Clunes, Inverness, "First Choice" (58,950)	10 0 0
3. A. M. Gordon of Newton, Inch, "Mario 2d" (59,439)	5 0 0
V. H. C.—John Gilmour of Lundin and Montrave, Leven, "Gem of Pennan." H. C.—John Ross, Meikle Tarrel, Fearn, "Ringleader." C.—Lord Polwarth, Mertoun House, St Boswells, "Royal Ensign" (58,050).	

SECTION 2. BULL, calved on or after 1st January 1890.

1. William Duthie, Collynie, Tarves, "Baron Bridekirk 3d" (66,302)	15 0 0
2. George Bruce, Heatherwick, Inverurie, "Seneca"	10 0 0
3. C. Lyon Mackenzie, Braelangwell, Invergordon, "Steadyman"	5 0 0
V. H. C.—Robert Turner, Cairnton of Boyndie, Portsoy, "Master of the Ring." H. C.—John Gilmour of Lundin and Montrave, Leven, "Excelsior." C.—John Stirling, Muirton Mains, Muir of Ord, "Beneter Violet."	

SECTION 3. BULL, calved on or after 1st January 1891.

1. J. D. Fletcher of Rosehaugh, Inverness, "Samson"	12 0 0
2. A. B. Law, Mains of Sanquhar, Forres, "Sanquhar"	8 0 0
Carry forward	<hr/> £90 14 0

Brought forward . . .	£90 14 0
3. J. D. Fletcher of Roschaugh, Inverness, "Kinellar Stamp" . . .	4 0 0
V. H. C.—Lord Polwarth, Mertoun House, St Boswells, "Royal Sovereign." H. C.—James M'William, Stonycroft, Keith, "Silver Star." C.—George Inglis, Newmore, Invergordon, "Just in Time."	
<i>Best Cow.</i> Given by Major Lyon Mackenzie of Braelangwell and other Shorthorn Breeders—Lord Polwarth, Mertoun House, St Boswells, "Wave of Indiana" . . .	10 0 0

SECTION 4. COW, of any age.

1. Lord Polwarth, Mertoun House, St Boswells, "Wave of Indiana" . . .	12 0 0
2. James M'William, Stonycroft, Keith, "Golden Gift" . . .	8 0 0
3. Lord Lovat, Beaufort, Beaulieu, "Beaufort Rose 5th" . . .	4 0 0
V. H. C.—George Campbell, Kinellar, Kinaldie, "Maid of Promise 6th." H. C.—A. M. Gordon of Newton, Inver, "Marietta." C.—Lord Lovat, Beaufort, Beaulieu, "Queen Undine."	

SECTION 5. HEIFER, calved on or after 1st January 1890.

1. Lord Polwarth, Mertoun House, St Boswells, "Telluria Casket" . . .	10 0 0
2. David Cooper, Baines, Catterick, "Lady Agnes" . . .	5 0 0
3. Lady Ross of Balnagown, Parkhill, Ross-shire, "Lady Anne" . . .	3 0 0
V. H. C.—Lord Lovat, Beaufort, Beaulieu, "Rose of Underly." H. C.—David Cooper, Baines, Catterick, "Lady Yarrowburgh."	

SECTION 6. HEIFER, calved on or after 1st January 1891.

1. J. A. Gordon of Arabelle, Nigg Station, "Lily of Novar" . . .	10 0 0
2. A. M. Gordon of Newton, Inver, "Butterscotch" . . .	5 0 0
3. Lord Polwarth, Mertoun House, St Boswells, "Wave Mist" . . .	3 0 0
V. H. C.—James M'William, Stonycroft, Keith, "Golden Seal." H. C.—John Gilmour of Lundin and Montrave, Leven, "Passion Flower." C.—C. M. Cameron, Balnakeil, Munloch, "Princess 9th."	

ABERDEEN-ANGUS.

Best Bull. Ballindalloch Challenge Cup, value £50, given by Mr Macpherson Grant of Drumduan. The Cup shall be held by the winner for one year, and shall become the property of the Exhibitor who shall win it five times, not necessarily in succession—Sir George Macpherson-Grant, Bart., Ballindalloch, "Prince Inca" (7844).

Breeder of Best Bull.—Sir George Macpherson-Grant, Bart., Ballindalloch, "Prince Inca" (7844) . . . Silver Medal 0 14 0

SECTION 7. BULL, calved before 1st December 1889.

1. Sir George Macpherson-Grant, Bart., Ballindalloch, "Prince Inca" (7844) . . .	15 0 0
2. Arthur Eginton, South Ella, Hull, "Epona" (7507) . . .	10 0 0
3. William Wilson, Coynachie and Drumfergus, Gartly, "Figaro" (6728) . . .	5 0 0
H. C.—David K. Steven, Comieston, Montrose, "Eric of Lauriston" (7509). C.—George Lawson, Leys Castle, Inverness, "Prince of Leys" (7852).	

SECTION 8. BULL, calved on or after 1st December 1889.

1. Sir George Macpherson-Grant, Bart., Ballindalloch, "Enthusiast of Ballindalloch" (8289) . . .	15 0 0
2. John Stuart, Stone Hurst, Ardingly, Sussex, "Financier of Ballindalloch" (8828) . . .	10 0 0
3. John Grant, Advie Mains, Advie, "Rustler" (8761) . . .	5 0 0
H. C.—W. T. B. Lawson, Braeton of Leys, Inverness, "Prince 2d of Leys" (8691). C.—The Queen, Abergeldie Mains, Ballater, "Baron Aboyne" (8087).	

Carry forward . . . £225 8 0

Brought forward . . . £225 8 0

SECTION 9. BULL, calved on or after 1st December 1890.

1. Sir George Macpherson-Grant, Bart., Ballindalloch, "Eltham" (9120)	12	0	0
2. J. D. Fletcher of Rosehaugh, Inverness, "Minotaur" (8421)	8	0	0
3. Marquis of Huntly, Aboyne Castle, Aboyne, "Privateer" (9550)	4	0	0
V. H. C.—James Wilson, Inchgower, Fochabers, "Savannah." H. C.—Earl of Strathmore, Glamis Castle, Glamis, "Kidnapper" (9300). C.—Lord Tweedmouth, Guisachan, Beaulieu, N.B., "Increment" (9249).			

Best Cow. Ballindalloch Challenge Cup, value £50, given by Mr Macpherson Grant of Drumduan. The Cup shall be held by the winner for one year, and shall become the property of the Exhibitor who shall win it five times, not necessarily in succession—The Queen, Abergeldie Mains, Ballater, "Miss Pretty" (12,313).

Breeder of Best Cow.—Colonel Ferguson of Pitfour, Mintlaw, "Miss Pretty" (12,313) . . . Silver Medal 0 14 0

Breeder of the best Aberdeen-Angus female. Given by Mrs Morison Duncan of Naughton—Colonel Ferguson of Pitfour, Mintlaw . 10 10 0

SECTION 10. COW, calved before 1st December 1888.

1. The Queen, Abergeldie Mains, Ballater, "Miss Pretty" (12,313)	12	0	0
2. Sir George Macpherson-Grant, Bart., Ballindalloch, "Eurya" (13,708)	8	0	0
3. John Grant, Advie Mains, Advie, "Ladybird" (13,727)	4	0	0
V. H. C.—Marquis of Huntly, Aboyne Castle, Aboyne, "St Agatha" (13,838). H. C.—James Reid, Greystone, Alford, "Annabella 6th of Asloun" (14,112). C.—Alex. Smith, Incheorsie, Rothiemay, Huntly, "Lady Neil" (13,020).			

SECTION 11. COW, three years old. Given by Mr Macpherson Grant of Drumduan.

1. Lord Tweedmouth, Guisachan, Beaulieu, "Grizel" (15,751)	12	0	0
2. Sir George Macpherson-Grant, Bart., Ballindalloch, "Equation" (15,047)	8	0	0
3. Sir George Macpherson-Grant, Bart., Ballindalloch, "Genista" (15,051)	4	0	0
V. H. C.—The Queen, Abergeldie Mains, Ballater, "Princess Irene 2d" (15,861).			

SECTION 12. HEIFER, calved on or after 1st December 1889.

1. Countess Dowager of Seafield, Cullen House, Cullen, "Sunrise of Cullen" (17,076)	10	0	0
2. The Queen, Abergeldie Mains, Ballater, "Pretty Peggy" (17,454)	5	0	0
3. Sir George Macpherson-Grant, Bart., Ballindalloch, "Rose of the Vicarage" (16,508)	3	0	0
V. H. C.—Earl of Strathmore, Glamis Castle, Glamis, "Milkmaid of Glamis" (17,264). H. C.—Miss Morison Duncan of Naughton, Dundee, "Pride of Guisachan 38th" (17,304). C.—D. C. Bruce, Byres Farm, Fochabers, "Budding Bloom" (17,595).			

SECTION 13. HEIFER, calved on or after 1st December 1890.

1. Owen C. Wallis, Bradley Hall, Wylam-on-Tyne, "Chaperon" (18,651)	10	0	0
2. Owen C. Wallis, Bradley Hall, Wylam-on-Tyne, "Jurinea" (18,660)	5	0	0
3. Andrew Mackenzie, Dalmore, Ainess, Ross-shire, "Pride of Avero" (18,165)	3	0	0
V. H. C.—Sir George Macpherson-Grant, Bart., Ballindalloch, "Blooming Maid" (17,934). H. C.—George Bruce, Tochnial, Cullen, "Janet of Balduig" (17,479). Earl of Strathmore, Glamis Castle, Glamis, "Vista of Glamis" (18,592). C.—Miss Morison Duncan of Naughton, Dundee, "Elena of Naughton" (17,774). J. D. Fletcher of Rosehaugh, Inverness, "Pride of the Highlands" (17,825). James Reid, Greystone, Alford, "Snowdrop of Greystone 4th" (18,346).			

Carry forward . . . £344 12 0

Brought forward . . . £344 12 0

GALLOWAY.

Breeder of Best Bull.—Thomas Biggar & Sons, Chapelton, Dalbeattie, "Camp Follower" (5042) . . . Silver Medal Q 14 0

SECTION 14. BULL, of any age.

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|--------------------------------------------------------------------|--------|
| 1. James Cunningham, Tarbreoch, Dalbeattie, "Camp Follower" (5042) | 15 0 0 |
| 2. R. & J. Shennan, Balig, Kirkcudbright, "Crown Jewel" (4853) | 10 0 0 |

SECTION 15. COW, of any age.

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|--------------------------------------------------------------------------------|--------|
| 1. James Cunningham, Tarbreoch, Dalbeattie, "Scottish Queen" (11,521) | 10 0 0 |
| 2. James Cunningham, Tarbreoch, Dalbeattie, "Madonna 2d of Tarbreoch" (11,056) | 7 0 0 |

SECTION 16. HEIFER, calved on or after 1st January 1890.

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|----------------------------------------------------------------------------|--------|
| 1. Leonard Pilkington, Cavens, Dumfries, "Tidy 5th of Drumlaurig" (11,933) | 10 0 0 |
| 2. James Cunningham, Tarbreoch, Dalbeattie, "Nancy Lee 3d" (11,992) | 7 0 0 |

SECTION 17. HEIFER, calved on or after 1st January 1891.

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|----------------------------------------------------------------------------------------|--------|
| 1. James Cunningham, Tarbreoch, Dalbeattie, "Luxury 2d of Tarbreoch" (12,558) | 10 0 0 |
| 2. Leonard Pilkington, Cavens, Dumfries, "Primrose of Drumlaurig" (12,448) | 7 0 0 |
| 3. James Cunningham, Tarbreoch, Dalbeattie, "Celestia 4th of Tarbreoch" (12,561) | 3 0 0 |
| V. H. C.—James Cunningham, Tarbreoch, Dalbeattie, "Lady Macduff of Tarbreoch" (12,551) | |

HIGHLAND.

Best Bull entered in the Highland Herd-Book. Cup, value £10, given by the Highland Cattle Society—John Stewart of Ensay, Obbe, "Ceatharnach Buidhe" (719).

Breeder of Best Bull.—John Stewart of Ensay, Obbe, "Ceatharnach Buidhe" (719) . . . Silver Medal 0 14 0

SECTION 18. BULL, calved before 1st January 1890.

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 1. John Stewart of Ensay, Obbe, "Ceatharnach Buidhe" (719) | 15 0 0 |
| 2. T. V. Smith of Ardtornish, Morvern, "Victor 5th" (951) | 10 0 0 |
| 3. Duke of Sutherland, K.G., Dunrobin Castle, Golspie, "Donull Biallach" | 5 0 0 |
| V. H. C.—Earl of Southesk, K.T., Kinnaird Castle, Brechin, "Sargon" (813). H. C.—Charles Murray of Lochearn, Lochearn, "Herach" (764). C.—Duke of Athole, K.T., Blair Castle, Blair Athole, "Donull Dubh" (874). | |

SECTION 19. BULL, calved on or after 1st January 1890.

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 1. O. Kennard, Tornore, Broadford, Skye, "An Gaisgeach" | 15 0 0 |
| 2. Mackintosh of Mackintosh, Moyhall, Inverness, "Lancer" (911) | 10 0 0 |
| 3. T. V. Smith of Ardtornish, Morvern, "Valentine 4th" (949) | 5 0 0 |
| V. H. C.—Earl of Southesk, K.T., Kinnaird Castle, Brechin, "Duke of Berwick" (877). H. C.—Duke of Athole, K.T., Blair Castle, Blair Athole, "Ceann-tighe." C.—John Malcolm of Poltalloch, Lochgilphead, "Fag-a-Bealach." | |

SECTION 20. BULL, calved on or after 1st January 1891.

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|------------------------------------------------------------------|--------|
| 1. T. V. Smith of Ardtornish, Morvern, "Victor 7th" | 12 0 0 |
| 2. Duke of Athole, K.T., Blair Castle, Blair Athole, "Adhollach" | 8 0 0 |

Carry forward . . . £505 0 0

	Brought forward	£505	6	0
3.	John Malcolm of Poltalloch, Lochgilphead, "An Toighre" (1879)	4	0	0
V.	H. C.—William D. Mackenzie of Farr, Daviot, Inverness, "Calum Riabhach of Farr." H. C.—Earl of Southesk, K.T., Kinnaird Castle, Brechin, "Sir Clair" (943). C.—Countess Dowager of Seafield, Castle Grant, Grantown, "Boy Grant."			

<i>Best Female.</i>	Given by Mr Malcolm of Poltalloch.—T. V. Smith of Ardtornish, Morvern, "Sgiathach 4th" (2276)	10	0	0
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SECTION 21. COW, of any age.

1.	Duke of Athole, K.T., Blair Castle, Blair Athole, "Te Bhuidhe" (1879)	12	0	0
2.	T. V. Smith of Ardtornish, Morvern, "Mary of Ardtornish" (1242)	8	0	0
3.	Sir Donald Currie of Garth and Glenlyon, M.P., Aberfeldy, "Ceannalta."	4	0	0
V.	H. C.—John Malcolm of Poltalloch, Lochgilphead, "Proiseag 4th" (1576). H. C.—John Malcolm of Poltalloch, Lochgilphead, "Ealasaid O'g." C.—Duke of Athole, K.T., Blair Castle, Blair Athole, "Bean O'g 3d" (1875).			

SECTION 22. HEIFER, calved on or after 1st January 1889.

1.	T. V. Smith of Ardtornish, Morvern, "Sgiathach 4th" (2276)	10	0	0
2.	John Malcolm of Poltalloch, Lochgilphead, "Ruadh Mhor" (1778)	5	0	0
3.	Earl of Southesk, K.T., Kinnaird Castle, Brechin, "Ruth Alan" (1778)	3	0	0
V.	H. C.—Lord Middleton, Applecross, Lochcarron, "Morag Buidhe." H. C.—Duke of Athole, K.T., Blair Castle, Blair Athole, "Te Riabhach 1st." C.—Earl of Southesk, K.T., Kinnaird Castle, Brechin, "Lucilla" (1764).			

SECTION 23. HEIFER, calved on or after 1st January 1890.

1.	T. V. Smith of Ardtornish, Morvern, "Cruinneag 2d"	10	0	0
2.	Duke of Athole, K.T., Blair Castle, Blair Athole, "Donnag 3d"	5	0	0
3.	J. R. Campbell, Shinness, Lairg, "Maire Ruadh"	3	0	0
V.	H. C.—John Malcolm of Poltalloch, Lochgilphead, "Riblinn." H. C.—Earl of Southesk, K.T., Kinnaird Castle, "Clare Delaware" (2281). C.—Earl of Southesk, K.T., Kinnaird Castle, Brechin, "Millicent Mull" (2299).			

SECTION 24. Best and second best Groups, consisting of BULL, COW, 2 HEIFERS (2 and 3 year old), drawn from the regular Sections, and the property of Exhibitor. The winner of the first prize not to be entitled to the second. Given by Mr Shoolbred of Wyvis.

1.	T. V. Smith of Ardtornish, Morvern	15	0	0
2.	Duke of Athole, K.T., Blair Castle, Blair Athole	10	0	0
C.	John Malcolm of Poltalloch, Lochgilphead.			

AYRSHIRE.

<i>Breeder of Best Bull.</i>	R. & P. Wardrop, Garlaff, Cumnock, "Flinn Again"	Silver Medal	0	14	0
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SECTION 25. BULL, of any age.

1.	C. Howatson of Dornel, Glenbuck, N.B., "Flinn Again"	15	0	0
2.	C. Howatson of Dornel, Glenbuck, N.B., "Royal Stuart"	10	0	0
3.	Richard Shanks, Braehead, Cumbernauld, "Laird of Cockpen"	5	0	0

SECTION 26. COW (in Milk), of any age.

1.	Leonard Pilkington, Cavens, Dumfries, "Mary"	10	0	0
	Carry forward	£644	14	0

	Brought forward	£644 14 0
2. Alexander Cross, Knockdon, Maybole, "Lady Grizel IV. of Knockdon" (8390)		7 0 0
3. James Risk, Drumbrae, Bridge of Allan, "Mabel"		3 0 0
V. H. C.—C. Howatson of Dornel, Glenbuck, N.B., "Mirley Kate."		
C.—J. Huntly Macdonald, Charleston, Inverness, "Whitie."		

SECTION 27. COW (in Calf), of any age.

1. Earl Cawdor, Cawdor Castle, Nairn, "Sonny"	10 0 0
2. James Risk, Drumbrae, Bridge of Allan, "Belle"	7 0 0
3. C. Howatson of Dornel, Glenbuck, N.B., "Nancy"	3 0 0

SECTION 28. HEIFER, calved on or after 1st January 1890.

1. C. Howatson of Dornel, Glenbuck, N.B., "Blossom" (7080)	10 0 0
2. Leonard Pilkington, Cavens, Dumfries, "Princess May" (7826)	7 0 0
3. Leonard Pilkington, Cavens, Dumfries, "Irene"	3 0 0

EXTRA CATTLE.

Very Highly Commended.

C. M. Cameron, Balnakyle, Munlochy, Shorthorn Ox, "True Scot"	5 0 0
Robert Turner, Cairnton of Boyndie, Portsoy, Aberdeen-Angus Heifer, "Princess Beatrice"	5 0 0
Earl of Cromartie, Parkhill, Ross-shire, Cross Heifer, "Pride of Tartart"	5 0 0

Highly Commended.

Countess Dowager of Seafield, Castle Grant, Grantown, Highland Ox, "Sandy"	3 6 0
	Minor Gold Medal
	<u>£713 0 0</u>

CLASS II.—HORSES.

FOR AGRICULTURAL PURPOSES.

<i>Best Stallion</i> , registered in Clydesdale Stud-Book—Champion Premium, given by the Clydesdale Horse Society.—William Taylor, Park Mains, Paisley, "Rosedale" (8194)	10 10 0
<i>Breeder of Best Male</i> .—John Lamont, Flemyland, Kilwinning, "Rosedale" (8194)	0 14 0
	Silver Medal

SECTION 1. STALLION, foaled before 1st January 1889.

1. William Taylor, Park Mains, Paisley, "Rosedale" (8194)	15 0 0
2. P. & W. Crawford, Eastfield House, Dumfries, "William Wood" (8391)	12 0 0
3. Alexander Scott, Berryyards Farm, Upper Greenock, "Hamish MacCunn"	8 0 0
4. George Bean, Balquhain Mains, Piteaple, "Mount Royal" (8065)	4 0 0
II. C.—Wm. Renwick, Meadowfield, Corstorphine, "Johnnie's Style" (8867)	
C.—Alexander MacRobbie, Sunnyside, Aberdeen, "Prince William" (6713)	

SECTION 2. ENTIRE COLT, foaled on or after 1st January 1889.

1. W. S. Park, Hatton, Bishopston, "Gallant Poteath" (8638)	15 0 0
2. J. & J. Wilson, Westburn Farm, Cambuslang, "Royal Stuart" (8968)	12 0 0
3. W. S. Park, Hatton, Bishopston, "Royal Signet" (8967)	8 0 0

Carry forward . . . £85 4 0

	Brought forward	£85	4	0
4. William Montgomery, Banks, Kirkcudbright, "Maccanig" (8802)		4	0	0
V. H. C.—Hugh Andrew, Lennoxlove, Acredale, Haddington, "Shaw-Stuart" (8986). H. C.—P. & W. Crawford, Eastfield, Dumfries, "Crusader of Orchard Mains" (9178). C.—Alexander Scott, Berryyards Farm, Upper Greenock, "Prince Wyben" (9364).				

SECTION 3. ENTIRE COLT, foaled on or after 1st January 1890.

1. William Montgomery, Banks, Kirkcudbright, "Belvidere" (9128)	15	0	0
2. William Clark, Netherlee, Cathcart, "Darnley Again" (9182)	10	0	0
3. J. D. Fletcher of Rosehaugh, Inverness, "Prince Albert of Rosehaugh" (9357)	6	0	0
4. William Clark, Netherlee, Cathcart, "Choice Goods" (9161)	3	0	0
V. H. C.—George Shepherd, Shethin, Tarves, "Maccamon's Erskine." H. C.—James Macalister, Meikle Kilmory, Rothesay, "Flashwork." C.—Earl of Strathmore, Glamis Castle, Glamis, "Life Guard."			

SECTION 4. ENTIRE COLT, foaled on or after 1st January 1891.

1. P. & W. Crawford, Eastfield, Dumfries	12	0	0
2. James Johnstone, Lochburnie, Maryhill, "Grandeur"	7	0	0
3. William Montgomery, Banks, Kirkcudbright, "M'Henry"	4	0	0
4. David Mitchell, Millfield, Polmont, "Prince of Millfield"	2	0	0
V. H. C.—James Kilpatrick, Craigie Mains, Kilmarnock, "Scottish Prince" H. C.—Earl of Strathmore, Glamis Castle, Glamis. C.—William Robertson, Linkwood, Elgin, "Sir William."			

Best Mare or Filly, registered in the Clydesdale Stud-Book—Cawdor Challenge Cup, value 50 guineas, given by the Clydesdale Horse Society. The Cup must be won three times by an Exhibitor (but not necessarily in consecutive years or with the same animal) before it becomes his absolute property.—James Lockhart, Mains of Airies, Stranraer, Filly, "Irene."

SECTION 5. MARE of any age (with Foal at foot).

1. W. H. Lumsden of Balmedie, Aberdeen, "Lady Dorothy" (8688)	15	0	0
2. William Park, Brunstane, Portobello, "Polly"	10	0	0
3. Earl Cawdor, Cawdor Castle, Nairn, "Decreto"	5	0	0
4. John Gilmour of Lundin and Montrave, Leven, "Forest Flower" (9527)	3	0	0
V. H. C.—John Marr, Cairnbrogie, Old Meldrum, "Darling 8th." H. C.—John Marr, Cairnbrogie, Old Meldrum, "Darling 6th" (9993). C.—C. Lyon-Mackenzie, Braelangwell, Invergordon, "Duchess."			

SECTION 6. MARE (in Foal), foaled before 1st January 1889.

1. R. Sinclair Scott, Burnside, Larps, "Scottish Snowdrop"	10	0	0
2. Earl Cawdor, Cawdor Castle, Nairn, "Lady Lawrence" (9476)	6	0	0
3. Patrick Stirling of Kippendavie, Dunblane, "Brenda of Kippendavie"	3	0	0
4. Patrick Stirling of Kippendavie, Dunblane, "Heroine" (11,081)	2	0	0
V. H. C.—Thomas Hay, Reeves, Forres, "Polly of Reeves." H. C.—Edward Balfour, yr. of Balbirnie, Markinch, "Miss Alice" (8019). C.—John Laing, Burgie Mains, Forres, "Dall 2d" (7431). Earl of Strathmore, Glamis Castle, Glamis, "Lauristina" (11,087).			

SECTION 7. FILLY, foaled on or after 1st January 1889.

1. James Lockhart, Mains of Airies, Stranraer, "Irene"	10	0	0
2. John Gilmour of Lundin and Montrave, Leven, "Montrave Maud"	6	0	0
3. J. Huntly Macdonald, Charleston, Inverness, "Maid"	3	0	0
4. C. Lyon-Mackenzie, Braelangwell, Invergordon, "Doll"	2	0	0
V. H. C.—Captain W. C. Ross, of Cromarty, "Dahlia." H. C.—C. Lyon-Mackenzie, Braelangwell, Invergordon, "Darling." C.—C. Lyon-Mackenzie, Braelangwell, Invergordon, "Dandy."			

Carry forward . . . £228 4 0

Brought forward . . . £228 4 0

SECTION 8. FILLY, foaled on or after 1st January 1890.

1. J. D. Fletcher of Rosehaugh, Inverness, "Montrave Primula" . . .	10	0	0
2. David Mitchell, Millfield, Polmont, "Lily Langtry" . . .	6	0	0
3. W. H. Lumsden of Balmedie, Aberdeen, "Balmedie Enchantress" . . .	3	0	0
4. David Mitchell, Millfield, Polmont, "Maritana" . . .	2	0	0
V. H. C.—H. G. Murray Stewart of Cally, Gatehouse, "Nancy 2d of Cally." H. C.—Earl Cawdor, Cawdor Castle, Nairn, "Begum." C.—Earl Cawdor, Cawdor Castle, Nairn, "Sundew."			

SECTION 9. FILLY, foaled on or after 1st January 1891.

1. David Mitchell, Millfield, Polmont, "Ellen Terry" . . .	10	0	0
2. J. D. Fletcher of Rosehaugh, Inverness, "Montrave Marietta" . . .	6	0	0
3. J. Huntly Macdonald, Charleston, Inverness, "Pride of Balmedie" . . .	3	0	0
4. A. B. Matthews, British Linen Bank, Newton-Stewart, "Princess May" . . .	2	0	0
V. H. C.—Earl of Strathmore, Glamis Castle, Glamis. H. C.—Earl Cawdor, Cawdor Castle, Nairn, "Maid of Lorne." C.—Edward Balfour, yr. of Balbirnie, Markinch, "Daisy of Balbirnie."			

HUNTERS AND ROADSTERS.

SECTION 10. MARE or GELDING, suitable for Field, foaled before 1st January 1889.

1. Dr G. H. Mackay, 13 North Street, Elgin, Gelding, "Friendship" . . .	10	0	0
2. George Wilkie, 49 Magdalen Green, Dundee, Gelding, "Noble Glansman" . . .	5	0	0
3. J. D. Fletcher of Rosehaugh, Inverness, Mare, "Christmas Pie" . . .	3	0	0
C.—F. W. Gibb, Union Bank House, Elgin, Gelding, "Archbank."			

SECTION 11. MARE or GELDING, suitable for Field, foaled on or after 1st January 1889.

1. William Taylor, Park Mains, Paisley, Gelding, "Chance" . . .	10	0	0
2. J. E. B. Baillie of Dochfour, Inverness, Gelding, "Marquis" . . .	5	0	0
3. J. D. Lumsden, Huntingtowerfield, Perth, Gelding, "Royalist" . . .	3	0	0
H. C.—T. J. Fraser, Corn Exchange Buildings, Glasgow, and Burnfoot, Inverness, Gelding, "Lovat."			

SECTION 12. MARE or GELDING, suitable for Field, foaled on or after 1st January 1890.

1. J. E. B. Baillie of Dochfour, Inverness, Gelding, "Whipper-in" . . .	8	0	0
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SECTION 13. MARE or GELDING, suitable as Hackney or Roadster, to be exhibited in Saddle only.

1. Andrew Hunter, Braehead House, Cathcart, Mare, "Coquette" . . .	8	0	0
2. James Johnstone, Lochburnie, Maryhill, Gelding, "Merry Boy" . . .	4	0	0
3. Alexander Scott, Berryyards Farm, Upper Greenock, Mare . . .	2	0	0
C.—J. D. Fletcher of Rosehaugh, Inverness, Gelding, "Harry."			

SECTION 14. MARE or GELDING, suitable for Driving, 8 years old and upwards, to be shown in Harness and Driven.

1. Andrew Hunter, Braehead House, Cathcart, N.B., Mare, "Lady Lofly" . . .	8	0	0
2. Alexander Scott, Berryyards Farm, Upper Greenock, Mare . . .	4	0	0
3. J. D. Fletcher of Rosehaugh, Inverness, Mare, "Madeline" . . .	2	0	0
V. H. C.—J. E. B. Baillie of Dochfour, Inverness, Gelding, "Satellite." H. C.—J. E. B. Baillie of Dochfour, Inverness, Gelding, "Starlight."			

Carry forward . . . £337 4 0

Brought forward . . . £337 4 0

SECTION 15. HORSE or MARE for Jumping.

1. F. W. Gibb, Union Bank House, Elgin, Gelding, "Archbank" .	20 0 0
2. George Watson, Eastern Stables, Petty Street, Inverness, Gelding, "George" .	10 0 0
3. Dr G. H. Mackay, 13 North Street, Elgin, Gelding, "Halton" .	5 0 0

SECTION 16. MARES, suitable for breeding Hunters, in foal to, or with foal at foot by, a thoroughbred Horse.—Four Prizes, £12, £8, £3, £2, given by Mr Gilmour of Montrave; and in addition a Gold Medal, or a Bronze Medal and £5, given by the Hunters' Improvement Society. Mares which have previously been awarded the Hunters' Improvement Society's Medal, and Mares which have previously won a Hunters' Improvement Society's Premium as a Brood Mare, are ineligible for this Medal.

1. William Murray, Bellfield, Inverness, "Starlight," (Bronze Medal, and £5) .	12 0 0
2. Capt. Clayhills Henderson, R.N., Invergowrie .	8 0 0
3. J. D. Fletcher of Rosehaugh, Inverness, "Finity" .	3 0 0
4. Alex. Shaw, Farraline, Stratherrick, Errogie, Inverness, "Primrose" .	2 0 0

SECTION 17. YEARLINGS, the produce of the Queen's Premium Stallions that have served in Scotland, or any other Thoroughbred Stallion stationed in Scotland, out of Mares of any breed. Given by Captain Clayhills Henderson of Invergowrie, R.N.

1. John Gilmour of Lundin and Montrave, Leven, Gelding, "Rajah" .	10 0 0
2. J. E. B. Baillie of Dochfour, Inverness, Colt (entire), "Master Hamilton" .	7 0 0
3. Capt. Clayhills Henderson, R.N., Invergowrie, Filly, "Louise" .	5 0 0
4. R. J. Mackay, Burgie Lodge, Forbes, Filly, "Lady Hamilton" .	2 0 0

PONIES.

SECTION 18. STALLION, 15 hands and under.

1. J. D. Fletcher of Rosehaugh, Inverness, "The Baron" (1884) .	4 0 0
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SECTION 19. MARE or GELDING, between 13 and 14½ hands.

1. James Johnstone, Lochburnie, Maryhill, Mare, "Ophelia" .	4 0 0
2. Gordon R. Shiach, 1 North Guildry Street, Elgin, Mare, "Norah" .	2 0 0
3. J. D. Fletcher of Rosehaugh, Inverness, Mare, "Maggie" .	1 0 0
H. C.—Alexander Scott, Berryvaid Farm, Upper Greenock, Mare, C.—E. J. Fraser-Tytler, Aldourie Castle, Inverness, Gelding, "Sambo."	

SECTION 20. MARE or GELDING, between 12 and 13 hands.

1. David Mitchell, Millfield, Polmont, Filly, "Surprise" .	4 0 0
2. James Johnstone, Lochburnie, Maryhill, Mare, "Tormentor" .	2 0 0
3. J. D. Lumsden, Huntingtowerfield, Perth, Mare, "Gipsy Queen" .	1 0 0
C.—Charles Kennedy, 49 Grant Street, Inverness, Filly, "Lady."	

SECTION 21. MARE or GELDING, under 12 hands.

1. James Johnstone, Lochburnie, Maryhill, Gelding, "Firebrand" .	4 0 0
2. Master A. Henderson, The Retreat, Dingwall, Mare, "Mousie" .	2 0 0
3. James Duncan, Fern Villa, Inverness, Gelding, "Prince" .	1 0 0
C.—Thomas Howe, Parks of Inshes, Inverness, Mare, "Florence Margaret."	

Carry forward . . . £446 4 0

Brought forward . . .	£446	4	0
<i>Best Shetland Pony</i> , given by the Shetland Pony Stud-Book Society.— Marquis of Londonderry, Seaham Hall, Seaham Harbour, Gelding, "Harold"	3	0	0

SECTION 22. SHETLAND STALLION, above 3 years, not exceeding 10½ hands.

1. Marquis of Londonderry, Seaham Hall, Seaham Harbour, "Laird of Noss" (20)	4	0	0
2. Andrew Macfarlane, Viewfield, Kingussie, "Marquis" (27)	2	0	0
3. C. Macpherson Grant of Drumduan, Forres, "Young Viscount" (48)	1	0	0
V. H. C.—Marquis of Londonderry, Seaham Hall, Seaham Harbour, "Najal." H. C.—George Bruce, Tochineal, Cullen, "Paris."			

SECTION 23. SHETLAND MARE or GELDING, above 3 years, not exceeding 10½ hands.

1. Marquis of Londonderry, Seaham Hall, Seaham Harbour, Mare, "Helga"	4	0	0
2. Alexander Cameron, Kirkton, Golspie, Mare, "Rose of Kirkton"	2	0	0
3. C. Macpherson Grant of Drumduan, Forres, Mare, "Erica"	1	0	0
V. H. C.—Marquis of Londonderry, Seaham Hall, Seaham Harbour, Mare, "Fido." H. C.—C. Macpherson Grant of Drumduan, Forres, Mare, "Pride of Thule" (107). C.—George Bruce, Tochineal, Cullen, Mare, "Ivy." Andrew Macfarlane, Viewfield, Kingussie, Mare, "Ruby."			

SECTION 24. SHETLAND STALLION, MARE, or GELDING under 3 years, not exceeding 10½ hands. Given by the Shetland Pony Stud-Book Society.

1. Marquis of Londonderry, Seaham Hall, Seaham Harbour, Gelding, "Harold"	4	0	0
2. Marquis of Londonderry, Seaham Hall, Seaham Harbour, Mare, "Griselda"	2	0	0
3. Andrew Macfarlane, Viewfield, Kingussie, Stallion, "Lordie"	1	0	0
V. H. C.—James Duncan, Fern Villa, Inverness, Stallion, "Rufus."			

SECTION 25. PONIES, 14 hands and under, for Jumping.

1. J. D. Fletcher of Rosehaugh, Inverness, Gelding, "Charlie" (forfeited).			
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EXTRA HORSES.

Very Highly Commended.

J. G. Macgregor, Fearn Farm, Fearn, Clydesdale Gelding, "Prince"	5	0	0
Duke of Sutherland, K. G., Dunrobin Castle, Golspie, Hackney Stallion, "Eddlethorpe Performer" (2052) (Medium Gold Medal)	5	10	0

Highly Commended.

Charles Tulloch, Tomhomie, Fort-George Station, Clydesdale Gelding, "Chance"	3	0	0
	£483	14	0

CLASS III.—SHEEP.

BLACKFACED.

Sheep (entered in any class, Male or Female) carrying the fleece best adapted for protecting the animal in a high, exposed, and stormy climate. Given by Mr Howatson of Glenbuck.

1. C. Howatson of Dornel, Glenbuck, N.B.	£2	0	0
2. C. Howatson of Dornel, Glenbuck, N.B.	1	0	0
3. R. & J. Cadzow, Borland, Biggar	0	10	0

Carry forward £3 10 0

		Brought forward	£3 10 0
SECTION 1. TUP, three Shear or upwards. Given by Mr Howatson of Glenbuck.			
1.	C. Howatson of Dornel, Glenbuck, N.B.	.	5 0 0
2.	C. Howatson of Dornel, Glenbuck, N.B.	.	3 0 0
SECTION 2. TUP, above 1 Shear.			
1.	C. Howatson of Dornel, Glenbuck, N.B.	.	10 0 0
2.	C. Howatson of Dornel, Glenbuck, N.B.	.	5 0 0
3.	R. Sinclair Scott, Flatt Farm, Largs	.	3 0 0
V.	H. C.—Donald T. Martin of Girgenti, Irvine. H. C.—Donald T. Martin of Girgenti, Irvine. C.—C. Howatson of Dornel, Glenbuck, N.B.	.	
SECTION 3. SHEARLING TUP.			
1.	C. Howatson of Dornel, Glenbuck, N.B.	.	10 0 0
2.	C. Howatson of Dornel, Glenbuck, N.B.	.	5 0 0
3.	C. Howatson of Dornel, Glenbuck, N.B.	.	3 0 0
V.	H. C.—R. & J. Cadzow, Borland, Biggar. H. C.—C. Howatson of Dornel, Glenbuck, N.B. C.—R. Sinclair Scott, Flatt Farm, Largs.	.	
SECTION 4. Five SHEARLING TUPS, bred and fed by Exhibitor. Given by Mr Howatson of Glenbuck.			
1.	C. Howatson of Dornel, Glenbuck, N.B.	.	4 0 0
2.	C. Howatson of Dornel, Glenbuck, N.B.	.	2 0 0
3.	R. & J. Cadzow, Borland, Biggar	.	1 0 0
C.—R. Sinclair Scott, Flatt Farm, Largs.			
SECTION 5. Three EWES, above 1 Shear, with their Lambs at foot.			
1.	P. M. Turnbull, Smithston, Gartly	.	8 0 0
2.	D. T. Martin of Girgenti, Irvine.	.	4 0 0
3.	James A. Gordon, Arabella, Nigg Station	.	2 0 0
V.	H. C.—D. T. Martin of Girgenti, Irvine. H. C.—R. Sinclair Scott, Flatt Farm, Largs.	.	
SECTION 6. TUP LAMB, bred and fed by Exhibitor. Given by Mr Howatson of Glenbuck.			
1.	Donald T. Martin of Girgenti, Irvine	.	3 0 0
2.	Donald T. Martin of Girgenti, Irvine	.	2 0 0
3.	Donald T. Martin of Girgenti, Irvine	.	1 0 0
V.	H. C.—Charles Howatson of Dornel, Glenbuck. H. C.—R. Sinclair Scott, Flatt Farm, Largs. C.—C. Howatson of Dornel, Glenbuck.	.	
SECTION 7. Three SHEARLING EWES or GIMMERS.			
1.	James Hamilton, Woolfords, Carnwarth	.	8 0 0
2.	D. T. Martin of Girgenti, Irvine.	.	4 0 0
3.	P. M. Turnbull, Smithston, Gartly	.	2 0 0
V.	H. C.—James A. Gordon of Arabella, Nigg Station. H. C.—John Gilmour of Lundin and Montrave, Leven.	.	
CHEVIOT.			
SECTION 8. TUP, above 1 Shear.			
1.	James Moffat, Craick, Hawick	.	10 0 0
2.	John A. Johnstone, Archbank, Moffat	.	5 0 0
3.	John A. Johnstone, Archbank, Moffat	.	3 0 0
V.	H. C.—Jacob Robson, Byrness, Otterburn. H. C.—Jacob Robson, Byrness, Otterburn.	.	
SECTION 9. SHEARLING TUP.			
1.	John Robson, Newton, Bellingham	.	10 0 0
2.	John A. Johnstone, Archbank, Moffat	.	5 0 0
Carry forward			£121 10 0

	Brought forward	£121 10 0
3. Jacob Robson, Byrness, Otterburn		8 0 0
V. H. C.—James Moffat, Craick, Hawick.	H. C.—John A. Johnstone,	
Archbank, Moffat.	C.—John Robson, Newton, Bellingham.	

SECTION 10. Three EWES, above 1 Shear, with their Lambs at foot.

1. Jacob Robson, Byrness, Otterburn	8 0 0
2. John Robson, Newton, Bellingham	4 0 0
3. J. B. Dudgeon, Crakaig, Loth, Sutherlandshire	2 0 0

SECTION 11. Three SHEARLING EWES or GIMMERS.

1. Jacob Robson, Byrness, Otterburn	8 0 0
2. J. B. Dudgeon, Crakaig, Loth, Sutherlandshire	4 0 0
3. John Robson, Newton, Bellingham	2 0 0
V. H. C.—Joan Robson, Newton, Bellingham.	H. C.—George Lawson & Sons, Clynelish, Brora.

BORDER LEICESTER.

THE TWEEDDALE GOLD MEDAL. *Best Border Leicester Tup in the Yard.*

Thomas Clark, Oldhamstocks Mains, Cockburnspath	18 5 8
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SECTION 12. TUP, above 1 Shear.

1. Thomas Clark, Oldhamstocks Mains, Cockburnspath	10 0 0
2. Mrs Fender, Northfield, Coldingham	5 0 0
3. Right Hon. Arthur J. Balfour of Whittinghame, M.P.	3 0 0
H. C.—Archibald Cameron, Killen Farm, Avoch.	

SECTION 13. SHEARLING TUP.

1. Thomas Clark, Oldhamstocks Mains, Cockburnspath	10 0 0
2. Thomas Clark, Oldhamstocks Mains, Cockburnspath	5 0 0
3. Duke of Buccleuch and Queensberry, K.T., Dalkeith Park, Dalkeith.	3 0 0
V. H. C.—Right Hon. Arthur J. Balfour of Whittinghame, M.P.	H. C.—Samuel Jack, Crichton Mains, Pathhead, Dalkeith.
	C.—William Ford, Fentonbarns, Drem.

SECTION 14. Three EWES, above 1 Shear.

1. Right Hon. Arthur J. Balfour of Whittinghame, M.P.	8 0 0
2. Mrs Fender, Northfield, Coldingham	4 0 0
3. Mrs Fender, Northfield, Coldingham	2 0 0
H. C.—Archibald Cameron, Killen Farm, Avoch.	

SECTION 15. Three SHEARLING EWES or GIMMERS.

1. Thomas Clark, Oldhamstocks Mains, Cockburnspath	8 0 0
2. William Ford, Fentonbarns, Drem	4 0 0
3. Mrs Fender, Northfield, Coldingham	2 0 0
H. C.—Duke of Buccleuch and Queensberry, K.T., Dalkeith Park, Dalkeith.	C.—Right Hon. Arthur J. Balfour of Whittinghame.

SHROPSHIRE.

SECTION 16. TUP, above 1 Shear.

1. John Wallace, Duniface, Leven, Fife	6 0 0
2. Earl of Strathmore, Glamis Castle, Glamis	4 0 0
3. David Buttar, Corston, Coupar-Angus	2 0 0
V. H. C.—David Buttar, Corston, Coupar-Angus.	H. C.—William Robertson, Linkwood, Elgin.
	C.—George Inglis of Newmore, Invergordon.

Carry forward . . £246 15 8

Brought forward . . . £246 15 8

SECTION 17. SHEARLING TUP.

1. David Buttar, Corston, Coupar-Angus	6 0 0
2. David Buttar, Corston, Coupar-Angus	4 0 0
3. David Buttar, Corston, Coupar-Angus	2 0 0
V. H. C.—David Buttar, Corston, Coupar-Angus. H. C.—David Buttar, Corston, Coupar-Angus. C.—David Buttar, Corston, Coupar-Angus.	

SECTION 18. Three EWES, above 1 Shear.

1. David Buttar, Corston, Coupar-Angus	5 0 0
2. David Buttar, Corston, Coupar-Angus	3 0 0
3. David Buttar, Corston, Coupar-Angus	2 0 0
H. C.—John Wallace, Duniface, Leven, Fife. C.—William Robertson, Linkwood, Elgin.	

SECTION 19. Three SHEARLING EWES or GIMMERS.

1. David Buttar, Corston, Coupar-Angus	5 0 0
2. David Buttar, Corston, Coupar-Angus	3 0 0
3. David Buttar, Corston, Coupar-Angus	2 0 0
V. H. C.—Earl of Strathmore, Glamis Castle, Glamis. H. C.—John Wallace, Duniface, Leven. C.—William Robertson, Linkwood, Elgin.	

EXTRA SECTIONS.

SECTION 20. Three BLACKFACED WETHERS, 1 Shear.

1. John Gilmour of Lundin and Montrave, Leven	4 0 0
2. John Gilmour of Lundin and Montrave, Leven	2 0 0
H. C.—George Downie, Balcomie, Crail, Fife. C.—William Tod, Par- dovan, Philipstoun.	

SECTION 21. Three CHEVIOT WETHERS, 1 Shear.

1. William Tod, Pardovan, Philipstoun	4 0 0
2. Archibald Cameron, Killen Farm, Avoch	2 0 0
H. C.—William Tod, Pardovan, Philipstoun. C.—George Lawson & Sons, Clynelish, Brora.	

SECTION 22. Three CROSS-BRED WETHERS, 1 Shear.

1. John Gilmour of Lundin and Montrave, Leven	4 0 0
2. John Gilmour of Lundin and Montrave, Leven	2 0 0
H. C.—George Lawson & Sons, Clynelish, Brora.	

EXTRA SHEEP.

Very Highly Commended.

John Gilmour of Lundin and Montrave, Leven, Fife, 3 Cross Shearling Wethers	Minor Gold Medal	3 6 0
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Highly Commended.

Charles Murray, Lochcarron, St Kilda Tup	Silver Medal	0 14 0
Charles Murray, Lochcarron, 2 Ewes (cross between Shetland Ewe and St Kilda Tup)	Silver Medal	0 14 0

 £301 9 8

. CLASSES I., II., III.—CATTLE, HORSES, AND SHEEP.

Champion Cup, value £50, given by Mr Macpherson of Corrimony, for the greatest number of points in Classes I., II., and III. (Cattle, Horses, and Sheep). Three points for a first prize; two points for a second prize; one point for a third prize. In the event of a tie, the greatest number of first prizes to carry. The Cup becomes the property of the Exhibitor winning most prizes in either one or all of these classes. No Gelding or Wether to count points, nor anything under the Class of Extra Stock. All stock must be the *bona fide* property of the Exhibitors.

C. Howatson of Dornel, Glenbuck, N.B. 38 POINTS.

CLASS IV.—SWINE.

LARGE WHITE BREED.

SECTION 1. BOAR.—*No Entry.*

SECTION 2. SOW.—*No Entry.*

SECTION 3. Three PIGS, not above 8 Months old.

- | | | | | | | |
|--------------------------------------------------|---|---|---|----|---|---|
| 1. Andrew Mackenzie, Dalmore, Alness, Ross-shire | . | . | . | £4 | 0 | 0 |
|--------------------------------------------------|---|---|---|----|---|---|

WHITE BREED OTHER THAN LARGE.

SECTION 4. BOAR.

- | | | | | | | |
|----------------------------------------------|---|---|---|---|---|---|
| 2. Major Randle Jackson of Swordale, Evanton | . | . | . | 2 | 0 | 0 |
|----------------------------------------------|---|---|---|---|---|---|

SECTION 5. SOW.—*No Entry.*

SECTION 6. Three PIGS, not above 8 Months old.—*No Entry.*

BLACK OR BERKSHIRE BREED.

SECTION 7. BOAR.

- | | | | | | | |
|------------------------------------------|---|---|---|---|---|---|
| 1. George Inglis of Newmore, Invergordon | . | . | . | 4 | 0 | 0 |
| 2. George Inglis of Newmore, Invergordon | . | . | . | 2 | 0 | 0 |
| C.—Duncan Forbes of Culloden, Inverness. | | | | | | |

SECTION 8. SOW.

- | | | | | | | |
|-------------------------------------------|---|---|---|---|---|---|
| 1. J. D. Fletcher of Rosehaugh, Inverness | . | . | . | 4 | 0 | 0 |
| 2. George Inglis of Newmore, Invergordon | . | . | . | 2 | 0 | 0 |

SECTION 9. Three PIGS, not above 8 Months old.

- | | | | | | | |
|-----------------------------------------|---|---|---|-----|---|---|
| 2. Duncan Forbes of Culloden, Inverness | . | . | . | 2 | 0 | 0 |
| | | | | £20 | 0 | 0 |

CLASS V.—POULTRY.

SECTION.

1. DORKING, Silver Grey. Cock—

- | | | | | | |
|--------------------------------------------|---|---|----|----|---|
| 1. Bisset & Laing, Burnside, Auchtermuchty | . | . | £1 | 0 | 0 |
| 2. James Cranston, Nunwood, Dumfries | . | . | 0 | 10 | 0 |
| C.—John Cran, Old Keith, Keith. | | | | | |

2. DORKING, Silver Grey. Hen—

- | | | | | | |
|----------------------------------------|---|---|---|----|---|
| 1. James Clunas, 76 High Street, Elgin | . | . | 1 | 0 | 0 |
| 2. James Clunas, 76 High Street, Elgin | . | . | 0 | 10 | 0 |
| C.—James Cranston, Nunwood, Dumfries. | | | | | |

3. DORKING, Silver Grey. Cockerel—

- | | | | | | |
|---------------------------------------------|---|---|---|----|---|
| 1. James Clunas, 76 High Street, Elgin | . | . | 1 | 0 | 0 |
| 2. James Cranston, Nunwood, Dumfries | . | . | 0 | 10 | 0 |
| C.—Bisset & Laing, Burnside, Auchtermuchty. | | | | | |

4. DORKING, Silver Grey. Pullet—

- | | | | | | |
|----------------------------------------|---|---|---|----|---|
| 1. James Clunas, 76 High Street, Elgin | . | . | 1 | 0 | 0 |
| 2. James Clunas, 76 High Street, Elgin | . | . | 0 | 10 | 0 |
| C.—James Cranston, Nunwood, Dumfries. | | | | | |

5. DORKING, Coloured. Cock—

- | | | | | | |
|--------------------------------------------|---|---|---|----|---|
| 1. Bisset & Laing, Burnside, Auchtermuchty | . | . | 1 | 0 | 0 |
| 2. Andrew Crichton, Estates Office, Glamis | . | . | 0 | 10 | 0 |
| C.—John Cran, Old Keith, Keith. | | | | | |

6. DORKING, Coloured. Hen—

- | | | | | | |
|--------------------------------------------|---|---|---|----|---|
| 1. Leonard Pilkington, Cavens, by Dumfries | . | . | 1 | 0 | 0 |
| 2. Bisset & Laing, Burnside, Auchtermuchty | . | . | 0 | 10 | 0 |
| C.—John Cran, Old Keith, Keith. | | | | | |

Carry forward	.	.	£9	0	0
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	Brought forward	£9 0 0
7. DORKING, Coloured. Cockerel—		
1. A. Sim, Maisondieu, Elgin	1 0 0	
2. Leonard Pilkington, Cavens, by Dumfries	0 10 0	
C.—Thomas Honeymann, Clunes, Fort-William.		
8. DORKING, Coloured. Pullet—		
1. Leonard Pilkington, Cavens, by Dumfries	1 0 0	
2. Peter Garrow, Dunkinty, Elgin	0 10 0	
C.—A. Sim, Maisondieu, Elgin.		
9. COCHIN-CHINA. Cock—		
1. David Grealey, 412 New City Road, Glasgow	1 0 0	
2. J. Hendrie, Newton House, Newton, Glasgow	0 10 0	
C.—David Grealey, 412 New City Road, Glasgow.		
10. COCHIN-CHINA. Hen—		
1. David Grealey, 412 New City Road, Glasgow	1 0 0	
2. J. Hendrie, Newton House, Newton, Glasgow	0 10 0	
C.—David Grealey, 412 New City Road, Glasgow.		
11. COCHIN-CHINA. Cockerel—		
1. J. Hendrie, Newton House, Newton, Glasgow	1 0 0	
2. David Marr, Schoolhouse, Maryton, Montrose	0 10 0	
12. COCHIN-CHINA. Pullet—		
1. J. Hendrie, Newton House, Newton, Glasgow	1 0 0	
13. BRAHMAPOOTRA. Cock—		
1. Countess of Aberdeen, Haddo House, Aberdeen	1 0 0	
2. D. J. Thomson Gray, The Lodge, Innerpefferay	0 10 0	
C.—James Lorimer, Sandridge Cottage, Monifieth.		
14. BRAHMAPOOTRA. Hen—		
1. James Lorimer, Sandridge Cottage, Monifieth	1 0 0	
2. D. J. Thomson Gray, The Lodge, Innerpefferay, Crieff	0 10 0	
C.—Countess of Aberdeen, Haddo House, Aberdeen.		
15. BRAHMAPOOTRA. Cockerel—		
1. James Lorimer, Sandridge Cottage, Monifieth	1 0 0	
16. BRAHMAPOOTRA. Pullet—		
1. James Lorimer, Sandridge Cottage, Monifieth	1 0 0	
2. Countess of Aberdeen, Haddo House, Aberdeen	0 10 0	
17. SCOTCH GREY. Cock—		
1. W. S. Mitchell, Castle Orchards, Airth, Larbert	1 0 0	
2. W. S. Mitchell, Castle Orchards, Airth, Larbert	0 10 0	
C.—A. W. Henderson, Airthrey Mills, Bridge of Allan.		
18. SCOTCH GREY. Hen—		
1. James S. Mitchell, Airth Castle, Stirlingshire	1 0 0	
2. A. W. Henderson, Airthrey Mills, Bridge of Allan	0 10 0	
C.—James S. Mitchell, Airth Castle, Stirlingshire.		
19. SCOTCH GREY. Cockerel—		
1. A. W. Henderson, Airthrey Mills, Bridge of Allan	1 0 0	
2. Archibald Mitchell, Airth Castle, Larbert	0 10 0	
C.—Archibald Mitchell, Airth Castle, Larbert.		
20. SCOTCH GREY. Pullet—		
1. Miss Mitchell, Airth Castle, Larbert	1 0 0	
2. Miss S. Plumber, Airth Castle, Larbert	0 10 0	
C.—John Carswell, Airth Mains, Airth, by Larbert.		
21. HAMBURG. Cock—		
1. William Kerr, Bandleath, Stirling	1 0 0	
2. J. M. Campbell, Yonderton, Bonny Kelly, New Deer	0 10 0	
22. HAMBURG. Hen—		
1. William Kerr, Bandleath, Stirling	1 0 0	
2. J. M. Campbell, Yonderton, Bonny Kelly, New Deer	0 10 0	
C.—Alexander Fraser, New Mill, Alves, Forres.		
23. HAMBURG. Cockerel—		
1. William Kerr, Bandleath, Stirling	1 0 0	
2. Robert Wood, Panmure, Carnoustie	0 10 0	
Carry forward	£33 10 0	

		Brought forward	£33 10 0
24.	HAMBURG. Pullet—		
	1. William Watson, Arns Farm, Clackmannan	1 0 0	
	2. William Kerr, Bandedeath, Stirling	0 10 0	
25.	PLYMOUTH ROCK. Cock—		
	1. Leonard Pilkington, Cavens, by Dumfries	1 0 0	
	2. Countess of Aberdeen, Haddo House, Aberdeen	0 10 0	
	C.—D. L. Picken, Milton Farm, Kirkcudbright.		
26.	PLYMOUTH ROCK. Hen—		
	1. Countess of Aberdeen, Haddo House, Aberdeen	1 0 0	
	2. Leonard Pilkington, Cavens, by Dumfries	0 10 0	
	C.—D. L. Picken, Milton Farm, Kirkcudbright.		
27.	PLYMOUTH ROCK. Cockerel—		
	1. Rev. Fitzroy Lloyd, The Priory, Pittenweem, Fife	1 0 0	
	2. Leonard Pilkington, Cavens, by Dumfries	0 10 0	
	C.—Rev. Fitzroy Lloyd, The Priory, Pittenweem, Fife.		
28.	PLYMOUTH ROCK. Pullet—		
	1. Rev. Fitzroy Lloyd, The Priory, Pittenweem, Fife	1 0 0	
	2. Leonard Pilkington, Cavens, by Dumfries	0 10 0	
	C.—John Macpherson, Dingwall.		
29.	MINORCA. Cock—		
	1. Bisset & Laing, Burnside, Auchtermuchty	1 0 0	
	2. James Morrison, Alma Cottage, Dingwall	0 10 0	
30.	MINORCA. Hen— <i>No Entry.</i>		
31.	MINORCA. Cockerel—		
	1. Mrs Kinnaird, Clockmill, Duns	1 0 0	
32.	MINORCA. Pullet—		
	1. Mrs Kinnaird, Clockmill, Duns	1 0 0	
	2. David Marr, Schoolhouse, Maryton, Montrose	0 10 0	
33.	LEGHORN. Cock— <i>No Entry.</i>		
34.	LEGHORN. Hen— <i>No Entry.</i>		
35.	LEGHORN. Cockerel—		
	1. Rev. George Ramsden, The Parsonage, Glamis	1 0 0	
	2. Richard A. Waugh, Dundas Castle, South Queensferry	0 10 0	
	C.—Rev. George Ramsden, The Parsonage, Glamis.		
36.	LEGHORN. Pullet—		
	1. Richard A. Waugh, Dundas Castle, South Queensferry	1 0 0	
37.	LANGSHAN. Cock—		
	1. John S. Pagan, Coulshill, Auchterarder	1 0 0	
	2. John S. Pagan, Coulshill, Auchterarder	0 10 0	
38.	LANGSHAN. Hen—		
	1. John S. Pagan, Coulshill, Auchterarder	1 0 0	
	2. John S. Pagan, Coulshill, Auchterarder	0 10 0	
39.	LANGSHAN. Cockerel—		
	1. John S. Pagan, Coulshill, Auchterarder	1 0 0	
	2. John S. Pagan, Coulshill, Auchterarder	0 10 0	
40.	LANGSHAN. Pullet—		
	1. John S. Pagan, Coulshill, Auchterarder	1 0 0	
	2. John S. Pagan, Coulshill, Auchterarder	0 10 0	
41.	WYANDOTTE. Cock— <i>No Entry.</i>		
42.	WYANDOTTE. Hen— <i>No Entry.</i>		
43.	WYANDOTTE. Cockerel—		
	1. James Morrison, Alma Cottage, Dingwall	1 0 0	
	2. Mrs Kinnaird, Clockmill, Duns	0 10 0	
44.	WYANDOTTE. Pullet—		
	1. James Morrison, Alma Cottage, Dingwall	1 0 0	
	2. Mrs Kinnaird, Clockmill, Duns	0 10 0	
		Carry forward	£56 10 0

	Brought forward	£56 10 0
45.	Any other Pure Breed. Cock— 1. David Marr, Schoolhouse, Maryton, Montrose (Poland) 2. Countess of Aberdeen, Haddo House, Aberdeen (Indian Game)	1 0 0 0 10 0
46.	Any other Pure Breed. Hen— 1. Countess of Aberdeen, Haddo House, Aberdeen (Indian Game)	1 0 0
47.	Any other Pure Breed. Cockerel— 1. James Tulloch, Dales, Inverkeithing (Indian Game)	1 0 0
48.	Any other Pure Breed. Pullet— <i>No Entry.</i>	
49.	GAME—Black or Brown Reds. Cock— 1. Leonard Pilkington, Cavens, by Dumfries 2. R. Gardiner Smith, Georgeville, Mid-Calder C.—R. Gardiner Smith, Georgeville, Mid-Calder.	1 0 0 0 10 0
50.	GAME—Black or Brown Reds. Hen— 1. Leonard Pilkington, Cavens, by Dumfries 2. R. Gardiner Smith, Georgeville, Mid-Calder C.—R. Gardiner Smith, Georgeville, Mid-Calder.	1 0 0 0 10 0
51.	GAME—Black or Brown Reds. Cockerel— 1. Leonard Pilkington, Cavens, by Dumfries	1 0 0
52.	GAME—Black or Brown Reds. Pullet— 1. Leonard Pilkington, Cavens, by Dumfries	1 0 0
53.	GAME—Any other Pure Breed. Cock— <i>No Entry.</i>	
54.	GAME—Any other Pure Breed. Hen— 1. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0
55.	GAME—Any other Pure Breed. Cockerel— 1. R. Gardiner Smith, Georgeville, Mid-Calder 2. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0 0 10 0
56.	GAME—Any other Pure Breed. Pullet— 1. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0
57.	BANTAM—Any Pure Breed. Cock— 1. Hynd Brothers, 27 Parkneuk, Dunfermline 2. Countess of Aberdeen, Haddo House, Aberdeen C.—A. W. Henderson, Airthrey Mills, Bridge of Allan.	1 0 0 0 10 0
58.	BANTAM—Any Pure Breed. Hen— 1. A. W. Henderson, Airthrey Mills, Bridge of Allan 2. Hynd Brothers, 27 Parkneuk, Dunfermline C.—Miss Robina Frew, Barony House, Cupar-Fife.	1 0 0 0 10 0
59.	BANTAM—Any Pure Breed. Cockerel— 1. John Ellis, Water Head, Edlleston 2. Thomas Milne, Aberdour, Fife C.—Countess of Aberdeen, Haddo House, Aberdeen.	1 0 0 0 10 0
60.	BANTAM—Any Pure Breed. Pullet— 1. Hynd Brothers, 27 Parkneuk, Dunfermline 2. Thomas Milne, Aberdour, Fife C.—Master Frew, Barony House, Cupar-Fife.	1 0 0 0 10 0
61.	DUCKS—White Aylesbury. Drake— 1. Miss Blackburn, Killearn, Glasgow 2. R. Gardiner Smith, Georgeville, Mid-Calder C.—Countess of Aberdeen, Haddo House, Aberdeen.	1 0 0 0 10 0
62.	DUCKS—White Aylesbury. Duck— 1. Countess of Aberdeen, Haddo House, Aberdeen 2. Andrew Macbean, Milton of Connage, Fort-George Station C.—John S. Pagan, Coulshill, Auchterarder.	1 0 0 0 10 0
63.	DUCKS—White Aylesbury. Drake (Young)— 1. John S. Pagan, Coulshill, Auchterarder 2. D. L. Picken, Milton Farm, Kirkcudbright	1 0 0 0 10 0
	Carry forward	£79 0 0

	Brought forward	£79 0 0
34. DUCKS—White Aylesbury. Duckling—		
1. John S. Fagan, Coulshill, Auchterarder	1 0 0	
2. D. L. Picken, Milton Farm, Kirkcudbright	0 10 0	
35. DUCKS—Rouen. Drake—		
1. D. L. Picken, Milton Farm, Kirkcudbright	1 0 0	
2. R. Gardiner Smith, Georgeville, Mid-Calder	0 10 0	
36. DUCKS—Rouen. Duck—		
1. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0	
2. D. L. Picken, Milton Farm, Kirkcudbright	0 10 0	
37. DUCKS—Rouen. Drake (Young)—		
1. D. L. Picken, Milton Farm, Kirkcudbright	1 0 0	
38. DUCKS—Rouen. Duckling—		
1. D. L. Picken, Milton Farm, Kirkcudbright	1 0 0	
39. DUCKS—Any other Pure Breed. Drake—		
1. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0	
2. Andrew Macbean, Milton of Connage, Fort-George Station	0 10 0	
C.—Alexander Kinnaird, Cawdor, Nairn (Pekin).		
70. DUCKS—Any other Pure Breed. Duck—		
1. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0	
2. J. D. Fletcher of Rosehaugh, Inverness (Pekin)	0 10 0	
71. DUCKS—Any other Pure Breed. Drake (Young)—		
1. George L. Oliver, Whithaugh, Newcastleton (Pekin)	1 0 0	
72. DUCKS—Any other Pure Breed. Duckling—		
1. George L. Oliver, Whithaugh, Newcastleton (Pekin)	1 0 0	
73. TURKEYS—Any Pure Breed. Cock—		
1. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0	
2. Robert Clark, Taybank, Errol (American Bronze)	0 10 0	
C.—Fred Usher, Norton Mains, Ratho Station (Bronze).		
74. TURKEYS—Any Pure Breed. Hen—		
1. Robert Clark, Taybank, Errol (American Bronze)	1 0 0	
2. Fred Usher, Norton Mains, Ratho Station (Bronze).	0 10 0	
75. TURKEYS—Any Pure Breed. Cock (Poult)—		
1. Abram Kerr, Castlehill, Thornhill, Dumfriesshire (Bronze).	1 0 0	
76. TURKEYS—Any Pure Breed. Hen (Poult)—		
1. Abram Kerr, Castlehill, Thornhill, Dumfriesshire (Bronze)	1 0 0	
77. GEESE—Any Pure Breed. Gander—		
1. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0	
2. D. L. Picken, Milton Farm, Kirkcudbright (Toulouse)	0 10 0	
C.—J. D. Fletcher of Rosehaugh, Inverness.		
78. GEESE—Any Pure Breed. Goose—		
1. R. Gardiner Smith, Georgeville, Mid-Calder	1 0 0	
2. D. L. Picken, Milton Farm, Kirkcudbright (Toulouse)	0 10 0	
C.—J. D. Fletcher of Rosehaugh, Inverness.		
79. GEESE—Any Pure Breed. Gander (Young)—		
1. D. L. Picken, Milton Farm, Kirkcudbright	1 0 0	
80. GEESE—Any Pure Breed. Gosling—		
1. D. L. Picken, Milton Farm, Kirkcudbright (Toulouse)	1 0 0	
	<u>£100 10 0</u>	

CLASS VI.—DAIRY PRODUCE.

SECTION.

1. CURED BUTTER, not less than 28 lb.—

1. Alexander Fleming, Threepland, Eaglesham	£4 0 0
2. Robert Gilmour, Stonebyres, Eaglesham	2 0 0

Carry forward . . . £6 0 0

	Brought forward	£6 0 0
3.	Henry Orr, Torrance, Armadale, West Lothian	1 0 0
	V. H. C.—George Morton, Kirktonmoor, Eaglesham.	
2.	POWDERED BUTTER, not less than 7 lb.—	
	1. Alexander Fleming, Threepland, Eaglesham	4 0 0
	2. Robert Gilmour, Stonebyres, Eaglesham	2 0 0
	3. Henry Orr, Torrance, Armadale, West Lothian	1 0 0
	V. H. C.—George Morton, Kirktonmoor, Eaglesham.	
3.	FRESH BUTTER, Three 1-lb. Rolls—	
	1. Henry Orr, Torrance, Armadale, West Lothian	4 0 0
	2. George Morton, Kirktonmoor, Eaglesham	2 0 0
	3. Alexander Fleming, Threepland, Eaglesham	1 0 0
	V. H. C.—Duff House Dairy, Banff. H. C.—Robert Gilmour, Stonebyres, Eaglesham. C.—J. Huntly Macdonald, Charleston, Inverness.	
		£21 0 0

CLASS VII.—HIGHLAND INDUSTRIES AND FISHERIES.

SECTION.

1.	Two PLAIDS, native wool, hand-spun, home-dyed, hand-loom woven—	
	1. George Maciver, Porin, Strathconan, Muir of Ord	£2 0 0
	2. Angus Pirie, Birch Cottage, Rogart	1 0 0
2.	WEB, not less than 25 yards TWEED, Cheviot wool, hand-spun, home-dyed, and hand-loom woven—	
	1. George Maciver, Porin, Strathconan, Muir of Ord	3 0 0
	2. Angus Pirie, Birch Cottage, Rogart	1 0 0
3.	WEB, not less than 25 yards TWEED, Blackfaced wool, hand-spun, home-dyed, and hand-loom woven—	
	1. George Maciver, Porin, Strathconan, Muir of Ord	3 0 0
	2. Arthur J. Campbell-Orde, Newton, Lochmaddy, North Uist	1 0 0
4.	WEB, 25 yards TWEED, light texture, for ladies' dresses, native wool, hand-spun, home-dyed, and hand-loom woven—	
	1. Christina Macleod, Stroud	3 0 0
	2. Margaret Campbell, Nishishee	1 0 0
	C.—Anne Macnish, Stroud; Mrs Macqueen, Knitlavig.	
5.	WEB, HARRIS TWEED, 25 yards, home wool and manufacture—	
	1. Johanna Morrison, Seaside Cottage, Tarbert, Harris	3 0 0
	2. Mrs Marion Macdonald, Stocknish	1 0 0
	C.—Johanna Morrison, Seaside Cottage, Tarbert, Harris.	
6.	WEB, not less than 16 yards of SHETLAND TWEED, of Shetland wool, hand-spun, home-dyed, and hand-loom woven—	
	1. Mr Cram, Lubba, Island of Roe	3 0 0
	2. Mr Williamson, Gillsrunner, Island of Roe	1 0 0
7.	Six pair STOCKING HOSE, hand-spun, home-dyed, and knitted by Exhibitor,—two pair plain ribbed, two pair diced tartan, two pair fancy—	
	1. Anne Mackenzie, Port Henderson, Gairloch	3 0 0
	2. Mrs Kenneth Macpherson, 28 Sand, Gairloch	1 0 0
8.	Twelve pair SOCKS of Blackfaced wool, hand-spun, home-dyed, and knitted by Exhibitor—	
	1. Anne Macdonald, 18 Sand, Gairloch	2 0 0
	2. Mrs William Mackenzie, 24 North Evadale, Gairloch	1 0 0
	C.—Mrs Duncan Mackenzie, 20 North Evadale, Gairloch.	
9.	Twelve pair SOCKS of Cheviot wool, hand-spun, home-dyed, and knitted by Exhibitor—	
	1. Johanna Morrison, Seaside Cottage, Tarbert, Harris	2 0 0
		£32 0 0

	Brought forward .	£32 0 0
10. Fine White SHETLAND SHAWL—		
1. Miss Fraser, Crossbister, Westing, Unst	3 0 0	
2. Miss Nisbet, Gritquoy, Uya Sound	2 0 0	
C.—Miss Moar, Underhoull, Westing, Unst.		
11. Thick Coloured SHETLAND SHAWL—		
1. Miss Gifford, Kirkabister, Island of Bressay	3 0 0	
2. Miss Christina Young, Water Lane, Lerwick	2 0 0	
C.—Margaret Brown, Harbour Street, Lerwick.		
12. Collection of not less than five Articles, of native wool, hand-spun, home-dyed, and knitted by Exhibitor—		
1. Mary Brown, Harbour Street, Lerwick	2 0 0	
2. Miss Agnes Nisbet, Gritquoy, Uya Sound	1 0 0	
C.—Maggie Anderson, Lerwick.		
12A. Collection of not less than five Articles, of native wool, hand-spun, home-dyed, and knitted by Exhibitor—		
1. Mrs Robertson, Island of Roe	2 0 0	
2. Mrs Malcolmson, Watery Town, Cunningsburgh	1 0 0	
13. Varieties of YARN, not less than eight cuts, hand-spun, home-dyed, and of native wool; 4 cuts of each colour—		
1. Mrs John Umphray, Island of Foula	2 0 0	
2. Mrs William MacIntosh, Strath, Gairloch	1 0 0	
H. C.—Mrs Alexander Bain, 5 Opinan, Gairloch. C.—Miss Gray, Island of Foula.		
14. Six Pair STOCKINGS, shop wool, but knitted by Exhibitor—		
1. Mrs Kenneth Morrison, 40 Big Sand, Gairloch	2 0 0	
2. E. Findlay, Montrose	1 0 0	
C.—Johanna Morrison, Seaside Cottage, Tarbert, Harris.		
	£54 0 0	

BLOCK TEST COMPETITION.

Tuesday, 26th July—

1. James Howe, Castleheather, Inverness	£2 0 0
2. Leslie Durno, Glack, Old Meldrum	1 0 0

Wednesday, 27th July—

1. James Henderson, Culrain, Invergordon	2 0 0
2. D. M'Raw, Moultavie, Alness	1 0 0

Thursday, 28th July—

1. John Birnie, Balnafetlack, Inverness	2 0 0
2. { Peter Brown, Glenbog, Daviot, Inverness } divided	0 0 0
{ F. D. Middleton, Rosefarm, Cromarty }	0 10 0
	£9 0 0

ABSTRACT OF PREMIUMS.

Cattle	£718 0 0
Horses	483 14 0
Sheep	301 9 8
Swine	20 0 0
Poultry	100 10 0
Dairy Produce	21 0 0
Highland Industries	54 0 0
Block Test	9 0 0
	£1702 18 8

JUDGES.

- SHORTHORN.**—T. H. Hutchinson, Manor House, Catterick; W. S. Marr, jun., Upper-mill, Tarves.
- ABERDEEN-ANGUS.**—George Wilken, Waterside of Forbes, Alford, N.B.; Robert Walker, Altyre, Forbes.
- GALLOWAY.**—Andrew Montgomery of Netherhall, Castle-Douglas.
- HIGHLAND.**—Duncan M'Diarmid, Camusericht, Rannoch.
- AYRSHIRE.**—Andrew Allan, Munnoch, Dalry, Ayr.
- STALLIONS AND ENTIRE COLTS.**—James Park, Dechmont, Cambuslang; James Weir, Sandilands, Lanark.
- MARES AND FILLIES.**—William Renwick, Meadowfield, Corstorphine; John Sleigh, Strichen Mains, Strichen.
- HUNTERS, ROADSTERS, AND PONIES.**—J. W. J. Paterson, Terrona, Langholm.
- SHETLAND PONIES.**—John M. Martin of Auchendennan, Alexandria.
- BLACKFACED.**—John Craig, Innergeldie, Comrie; James Greenshields, West Town, Lesmahagow.
- CHEVIOT.**—John Elliot, Hindhope, Jedburgh.
- BORDER LEICESTER.**—Robert Wallace, Auchenbrain, Mauchline; William Bain, Legars, Kelso.
- SHROPSHIRE.**—John Harding, Norton House, Shifnal.
- FAT SHEEP.**—Matthew Elliot, Butcher, Inverness.
- SWINE.**—Robert Wallace, Auchenbrain, Mauchline.
- POULTRY.**—George Blackstock, 26 Kelvinside Gardens, Glasgow.
- DAIRY PRODUCE.**—Provost Samson, Cumnock.

ATTENDING MEMBERS.

- SHORTHORN.**—Major Randle Jackson of Swordale; John A. Mather, Delnies.
- ABERDEEN-ANGUS.**—William Ford, Fentonbarns; Charles Howatson of Glenbuck; Duncan Cameron, Fettes.
- GALLOWAY.**—John Miller of Scrabster; Colin M. Cameron, Balnakyle.
- HIGHLAND.**—Sir Robert Menzies of Menzies, Bart.; John Cran, Kirkton; Walter Armas, Fodderty.
- AYRSHIRE.**—Sir George Macpherson-Grant of Ballindalloch, Bart.; Sir A. G. Ramsay Mackenzie of Coull, Bart.
- STALLIONS AND ENTIRE COLTS.**—R. Sinclair Scott, Burnside; Capt. Clayhull Henderson of Invergowie, R.N.; William M'Bean, Cradlehall.
- MARES, FILLIES, AND GELDINGS.**—George J. Walker, Portlethen; Alexander Murdoch, Carteraig; John Hunter, Dipple.
- HUNTERS, ROADSTERS, AND PONIES.**—Alexander Macduff of Bonhard; Andrew Mackenzie, Dalmore; C. J. B. Macpherson of Belleville.
- SHETLAND PONIES.**—W. H. Lumsden of Balmedie; G. R. Mackessack, yr. of Ardygo.
- BLACKFACED.**—Duncan Forbes of Culloden; William S. Ferguson, Pictstonhill; J. B. Grant, Erchless.
- CHEVIOT.**—R. Shirra Gibb, Boon; Donald Fisher, Jellyholm; Sir Hector Munro of Foulis, Bart.
- BORDER LEICESTER.**—John Marr, Cairnbrogie; Major Rose of Kilravock; George Malcolm, Invergarry.
- SHROPSHIRE.**—John Gilmour of Montrave; John Ballingall, Dunbog; J. S. Robertson, Cawdor.

FAT SHEEP.—A. M. Gordon of Newton; Major Grant.

SWINE.—Donald Maclean, Dunrobin; Alexander Maclellan, Drumore.

POULTRY.—Robert Paterson, Hill of Drip; William Anderson, Inverness.

DAIRY PRODUCE.—Provost Ross, Inverness; Farquhar Urquhart, Inverness.

III.—DISTRICT COMPETITIONS.

CATTLE, HORSES, AND SHEEP.

NAME OF DIST.	PREMIUM AWARDED TO	FOR	AMOUNT.
<i>Garioch</i>	A. M. Gordon of Newton	Shorthorn Bull . . .	£2 0 0
	A. M. Gordon of Newton	do. do. . . .	1 0 0
	James Merson, Craigwillie	do. Heifer . . .	2 0 0
	John Law, New Keig	do. do. . . .	1 0 0
	James Stephen, Conglass	Aberdeen-Angus Bull . .	2 0 0
	John Walker, Isaacton, } Inverurie	do. do. . . .	1 0 0
	James Reid, Greystone	do. Cow . . .	2 0 0
	James Reid, Greystone	do. Heifer . . .	1 0 0
<i>Dalbeattie</i>	William Hood, Chapelton	Mare with Foal at foot . .	3 0 0
	William Hood, Chapelton	do. . . .	2 0 0
	Andrew Mitchell, Barcheskie	Two-year-old Filly . . .	3 0 0
	John M'Cubbing, Drum	do. . . .	2 0 0
	William Montgomery, Banks	Entire Colt . . .	2 0 0
<i>Deeside Union</i>	John Davidson, Harestone	Shorthorn Bull . . .	1 12 6
	David Nicol, Upper Anguston	do. . . .	1 7 6
	Alex. Barron, Templefold	do. . . .	1 0 0
	Adam Todd, Nether Mills } of Drum	Aberdeen-Angus Bull . .	1 12 6
	Colonel Innes of Learney	do. . . .	1 7 6
	Walter Fowler, Finnercy	do. . . .	1 0 0
	Peter Mackie, Kinnmundy	Aberdeen-Angus Heifer . .	1 12 6
	Peter Mackie, Kinnmundy	do. . . .	1 7 6
	Adam Todd, Nether Mills } of Drum	do. . . .	1 0 0
<i>Turriff</i>	William Webster, Towie	Shorthorn Bull . . .	1 0 0
	James Leith, Glengerrack } Mains	do. Cow . . .	1 0 0
	James Leith, Glengerrack } Mains	do. Heifer . . .	1 0 0
	Wm. Murray, Mains of } Pittendreigh	do. Cow and two of her } progeny	1 0 0
	George Ritchie, Woodside } of Delgaty	Aberdeen-Angus Bull . .	1 0 0
	Col. Morison, Mounthlairy	do. Cow . . .	1 0 0
	G. A. Duff, Hatton Castle	do. Heifer . . .	1 0 0
	Robert Cruickshank, Clay- } mires	do. Cow and two } of her progeny	1 0 0
	George Bean, Balquhain } Mains	Clydesdale Entire Colt . .	1 0 0
	George Bean, Balquhain } Mains	do. Mare . . .	1 0 0
	G. & J. Cocker, Hill of Petty	do. Filly . . .	1 0 0
	George Bean, Balquhain } Mains	do. Mare and two of her } progeny	1 0 0
<i>Biggar</i>	R. & J. Cadzow, Boreland	Blackfaced Shearling Tup . .	2 0 0
	R. & J. Cadzow, Boreland	do. . . .	1 5 0
	R. & J. Cadzow, Boreland	do. . . .	0 15 0
Carry forward			£52 0 0

NAME OF DIST.	PREMIUM AWARDED TO	FOR	AMOUNT.
		Brought forward	£52 0 0
<i>Biggar— contd.</i>	W. Watson, Whitfield	Cheviot Shearling Tup . . .	2 0 0
	J. Paterson South Slipper- field }	do.	1 5 0
	W. Watson, Whitfield	do.	0 15 0
	W. Noble, Lochurd	Border Leic. Shear. Tup . . .	2 0 0
	T. & J. Tennant, Dyke	do.	1 5 0
	W. Noble, Lochurd	do.	0 15 0
<i>Breadalbane</i>	Thos. Watters, Glenample	Blackfaced Aged Tup . . .	1 10 0
	Angus Fletcher, Auchtertyre	do.	1 0 0
	John Fisher, Auchrioch	do.	0 10 0
	John Fisher, Auchrioch	Blackfaced Shear. Tup . . .	1 10 0
	Trs. of Jn. Willison, Acharn	do.	1 0 0
	Peter Fisher, Braes	do.	0 10 0
	Trs. of Jn. Willison, Acharn	Blackfaced Ewes	1 10 0
	Trs. of Jn. Willison, Acharn	do.	1 0 0
	Marquis of Breadalbane, } Taymouth }	do.	0 10 0
	Trs. of Jn. Willison, Acharn	Blackfaced Gimmers . . .	1 10 0
	Marquis of Breadalbane, } Taymouth }	do.	1 0 0
	Trs. of Jn. Willison, Acharn	do.	0 10 0
<i>Eastern Dis- trict of Stirling- shire</i>	W. & J. Weir, Rosehill	Ayrshire Bull	3 0 0
	David Mitchell, Millfield	Brood Mare	3 0 0
	David Mitchell, Millfield	One-year-old Entire Colt . .	3 0 0
	Andw. Reid, Haining Valley	Group of Leicester Sheep . .	3 0 0
<i>Kincardine- shire</i>	John Taylor, Uras	Shorthorn Cow	3 0 0
	Jas. Milne, jun., Cawnhill	do. Bull	3 0 0
	R. W. Duff of Fetteresso, } M.P. }	Draught Filly	3 0 0
	D. A. Pearson of Johnstone	Brood Mare	3 0 0
<i>Spey, Aven, and Fud- dochside</i>	John Fettes, Westertown	Shorthorn Bull	Minor Silver Medal
	John Macpherson, Mulben	{ Aberdeen- Angus Bull }	Minor Silver Medal
	James Sutor, The Collie	{ Border Leic. Shear. Tup }	Minor Silver Medal
<i>Jed-Forest</i>	Andrew Haddon, Honeyburn	{ Clydesdale Mare }	Minor Silver Medal
	John Simson, Oxnam Row	Cross Ox	Minor Silver Medal
	John Scott, Cessford	{ Half-bred Gimmers }	Minor Silver Medal
<i>Lammermoor</i>	W. & W. Elliot, Harehead	{ Half-bred Gimmers }	Minor Silver Medal
	Isaac F. Bayley, Hales	{ Cheviot Gimmers }	Minor Silver Medal
	Lady John Scott, Flass	{ Blackfaced Ewes }	Minor Silver Medal
<i>Lockerbie</i>	Andrew Montgomery, Ne- therhall }	Stallion	15 0 0
<i>Western Dis- trict of Mid- Lothian</i>	{ Peter Crawford, Dumfries }	Stallion	15 0 0
<i>Dalbeattie</i>	Andrew Montgomery, Ne- therhall }	Stallion	15 0 0
9 Minor Silver Medals			£141 0 0
			2 8 0
			£143 8 0

SPECIAL GRANTS.

<i>Ayrshire Agricultural Association</i>	{ Vote to Dairy Produce Show at }	£20	0	0
	Kilnarnock			
<i>Orkney Agricultural Society</i>	Vote in aid of Premiums	.	3	0
<i>Orkney Horse-Breeding Society</i>	do. do.	.	3	0
<i>Rousay Agricultural Society</i>	do. do.	.	3	0
<i>South Uist and Barra</i>	do. do.	.	3	0
<i>North Uist</i>	do. do.	.	3	0
			£35	0

MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

Minor Silver Medals were awarded to the following:—

ABERDEENSHIRE.

NAME OF DIST.	SILVER MEDAL AWARDED TO	FOR
<i>Cluny, Monymusk, and Midmar</i>	William Connon, Coullie	Shorthorn Bull
<i>Inverurie</i>	Wm. L. Chivas, Inver	Brood Mare
	James Stephen, Conglass	Aberdeen-Angus Cow
	James Merson, Craigwillie	Shorthorn Heifer
<i>Ythanside</i>	George Shepherd, Shethin	Clydesdale Mare
	R. Copland, Milton	Cross Heifer

ARGYLLSHIRE.

<i>Kilfinan</i>	Duncan Thomson, Inveryne	Clydesdale Yearling Colt
	John M'Callum, Stillage	Ayrshire Bull
<i>Lorn</i>	Alexander Langwill, Ardconnel	Ayrshire Bull
	Malcolm Sinclair, Culnadalloch	Highland Bull
<i>Nether Lorn</i>	Allan Hall, Ardmaddy	Highland Bull
	Duncan M'Cowan, Obanseat	Ayrshire Cow

AYRSHIRE.

<i>Dundonald</i>	Thomas Goldie, Oldhall	Ayrshire Bull
	James Dunlop, Barrassie	Clydesdale Mare
<i>Fenwick</i>	Thomas Barr, Monkland	Ayrshire Bull
	Alexander Watt, Greenlaw	Draught Gelding
<i>Kilbirnie</i>	Patrick Coul, Wattiestone	Ayrshire Cow
	James Kerr, Barrhill	Clydesdale Mare
<i>Kilnarnock</i>	John Craig, South Hall	Blackfaced Tup
	John Miller, Lambhill	Blackfaced Ewe
<i>Muirkirk</i>	Gavin Moffat, Kaim	Ayrshire Bull
	Gavin Moffat, Kaim	Clydesdale Mare

BUTE.

<i>Bute</i>	Hugh M'Fie, Ballicaul	Ayrshire Bull
	R. & J. M'Alister, Mid Ascog	Clydesdale Mare

DUMFRIESSHIRE.

<i>Moffat and Upper Annandale</i>	J. A. Johnston, Archbank	Cheviot Tup
<i>Sanguhar</i>	Wm. Vivers, Dornocktown	Clydesdale Mare
	Abram Kerr, Castlehill	Ayrshire Cow
	Robert Dalglish, Ulzieside	Cheviot Tup

ELGINSHIRE.

<i>Forres and Northern Fat Cattle Club</i>	{ Mrs Sutor, The Collie	Poultry
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FIFESHIRE.		
NAME OF DIST	SILVER MEDAL AWARDED TO	FOR
<i>Ballingry and Auchterdenan</i>	William Meiklem, Begg William Meiklem, Begg	Collection of Roots Collection of Seeds
HADDINGTONSHIRE		
<i>United East Lothian</i>	Hugh Andrew, Lennoxlove Right Hon A. J. Balfour of Whittinghame, M.P.	Clydesdale Stallion Shorthorn Heifer
INVERNESS SHIRE		
<i>Glen Urquhart</i>	L. A. Stuart, Kerrodoun Countess Dowager of Seafield, Balmain	Sandy Oats Magnum Bonum Potatoes
KIRKCUDBRIGHTSHIRE.		
<i>Dalry</i>	Miss R. McNaught, Dalry Mrs Smith, Boreland	Poultry Butter
LANARKSHIRE		
<i>Carmunnoch</i>	Alex Crawford, Netherton	Ayrshire Cow
<i>Lanarkshire</i>	Wm Fleming, Windlaw	Ayrshire Bull
<i>Lesmahagow</i>	J & J Wilson, Westburn	Ayrshire Bull
	Robert Murdoch, Hallside	Clydesdale Mare
	Andw Torrance, Kypesside	Ayrshire Cow
	Robt McKimlay, Hillhouse	Ayrshire Bull
<i>Shotis, Calder-waterhead</i>	Archd Torrance, Watsonhead	Ayrshire Cow
	David Adams, Draffan	Clydesdale Colt
LINLITHGOWSHIRE		
<i>West Lothian</i>	John Meikle, Grongfoot William Park, Brunstane	Ayrshire Cow Clydesdale Mare
PERTSHIRE		
<i>St. Athearn</i>	Colonel Stirling of Kippendavie Peter McIntyre, Tighnabalan	Clydesdale Mare Blackfaced Tup
RENFREWSHIRE		
<i>Kilmalcolm and Port-Glasgow</i>	James Scott, Braehead Farm	Ayrshire Cow
<i>Lower Ward of Renfrewshire</i>	Wm Neilson, Mathernock R Sinclair Scott, Burnside R Erskine, Buck of Hill	Clydesdale Mare Blackfaced Ewe Hogs Leicester Tup

53 Minor Silver Medals, £14, 2s 8d

PLOUGHING COMPETITIONS

In 1891-92 the Society's Silver Medal was awarded at 171 Ploughing Competitions,
171 Minor Silver Medals, £45, 12s.

IV.—COTTAGES AND GARDENS.

Money Premiums	£1 10 0
37 Minor Silver Medals	9 17 4
Total	<u>£11 7 4</u>

V.—VETERINARY DEPARTMENT.

CLASS EXAMINATIONS—1892.

Silver Medals were awarded to the following:—

ROYAL (DICK) VETERINARY COLLEGE.

J. D. Stewart	Physiology	F. C. Mason	Botany
F. C. Mason	Junior Anatomy	J. Davidson	Vet. Med. & Surgery
R. S. White	Chemistry	J. Davidson	Cattle Pathology
J. Davidson	Materia Medica	T. G. Heatley	Practical Pathology
John W. Lazenby	Senior Anatomy	F. C. Mason	Practical Chemistry

NEW VETERINARY COLLEGE, EDINBURGH.

A. G. Todd	Path. of the Horse	R. C. Moore	Junior Anatomy
O. C. Bradley	Path. of the Ox, &c.	J. Spreull	Botany
J. C. Carpenter	Morbid Anatomy	W. Webster	Chemistry
H. G. Bowes	Senior Anatomy	H. G. Bowes	Physiology

GLASGOW VETERINARY COLLEGE.

James Furniss	Horse Pathology	Robert Moore	Physiology
Alex. M'Nairn	Cattle Pathology	Tom C. Ferguson	Junior Anatomy
James Steel	Senior Anatomy	Andrew Hart	Chemistry
James Furniss	Materia Medica	Tom C. Ferguson	Botany

26 Large Silver Medals, £18, 4s.

VI.—AGRICULTURAL CLASS, EDINBURGH UNIVERSITY.

Marcus C. Ward, Midhouse, Kirkwall	£3 6 8
Robert Affleck, Castle-Douglas	3 6 8
James L. Duncan, Birgidale, Rothesay	3 6 8
	<u>£10 0 0</u>

ABSTRACT OF PREMIUMS.

1. ESSAYS AND REPORTS	£25 0 0
2. INVERNESS SHOW	1702 13 8
3. DISTRICT SHOWS:—	
Stock	£143 8 0
Special Grants	35 0 0
Local Societies—53 Medals	14 2 8
Ploughing Associations—171 Medals	45 12 0
	<u>238 2 8</u>
4. COTTAGES AND GARDENS—Money Premiums, £1, 10s.; Minor Silver Medals, £9, 12s.	11 7 4
5. VETERINARY DEPARTMENT—Medals to Students	18 4 0
6. AGRICULTURAL CLASS, EDINBURGH UNIVERSITY	10 0 0
	<u>£2005 7 8</u>

STATE OF THE FUNDS OF THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

At 30th NOVEMBER 1892.

I. BONDS—

Heritable—£11,000 at 4½ per cent, £1,300 at 4 per cent,
£4,000 at 3½ per cent, £500 at 3½ per cent . . . £16,800 0 0

II. DEBENTURE STOCK—

£4,250 North British Railway Company 3 per cent, at £98½	£4,202 3 9
£2,727 Caledonian Railway Company 4 per cent, at £132½	3,603 1 0
£1,000 London and North-Western Railway Company 4 per cent, at £138	1,380 0 0
	9,185 4 0

III. BANK STOCKS—

£6,407 7 8 Royal Bank of Scotland, at £235½	£15,089 7 9
2,218 16 5 Bank of England, at £343	7,610 11 2
2,000 0 0 British Linen Company Bank, at £352	7,040 0 0
500 0 0 British Linen Company Bank, new issue at £344	1,720 0 0
1,250 0 0 National Bank of Scotland, at £335½	4,193 15 0
1,080 0 0 Commercial Bank of Scotland (equivalent to 54 shares of £100 each, £20 paid), at £65½ per share of £20 paid	3,550 10 0
1,091 13 4 Bank of Scotland, at £325	3,547 18 4
	42,752 2 3
<u>£14,547 17 5</u>	

Note.—The original cost of these Bank Stocks was £23,860, 19s. 6d., showing a profit, at present prices, of £18,891, 2s. 9d.

IV. TEN SHARES (£500) OF THE BRITISH FISHERIES SOCIETY, valued at . . .	200 0 0
V. DEPOSIT-RECEIPT WITH ROYAL BANK OF SCOTLAND . . .	192 11 0
VI. ARREARS OF MEMBERS' SUBSCRIPTIONS considered recoverable . . .	50 15 6

Deduct.—BALANCE DUE TO ROYAL BANK ON ACCOUNT CURRENT, at 30th November 1892 . . .	£69,480 13 6
	1,575 3 3

AMOUNT OF GENERAL FUNDS . . .	£67,905 10 3
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VII. BUILDING FUND—

1. Estimated value of Building, No. 3 George IV. Bridge . . .	£3,100 0 0
2. Sum lent on Heritable Bond, at 3½ per cent . . .	350 0 0
3. Deposit with Royal Bank of Scotland . . .	110 16 11
	£3,560 16 11
AMOUNT OF BUILDING FUND . . .	£3,569 16 11

VIII. TWEEDDALE MEDAL FUND—

Heritable Bond, at 3½ per cent . . .	£500 0 0
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IX. FURNITURE—

Estimated Value of Furniture, Paintings, Books, &c. . .	£1,000 0 0
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W. S. WALKER, *Treasurer.*

G. GRAHAM MONTGOMERY, *Member of Finance Committee.*

WM. HOME COOK, C.A., *Auditor.*

EDINBURGH, 8d January 1893.

VIEW OF THE INCOME AND EXPENDITURE

For the Year 1891-92.

INCOME.

1. ANNUAL SUBSCRIPTIONS AND ARREARS received	£675 6 0
2. LIFE SUBSCRIPTIONS received	563 13 6
	<hr/>
	£1,238 19 6
3. INTERESTS AND DIVIDENDS received—	
Interests	£987 10 3
Dividends	1,569 3 0
	<hr/>
	2,556 13 3
4. INCOME FROM BUILDING FUND	1 18 7
5. RECEIPTS in connection with former Shows	58 14 11
6. TRANSACTIONS—Sales from Messrs Blackwood & Sons	9 6 0
7. SUM received from Government in aid of Agricultural Experiments	200 0 0
8. BALANCE OF RECEIPTS from Inverness Show	613 15 9
	<hr/>
	£4,679 8 0

EXPENDITURE.

1. ESTABLISHMENT—	
Salaries and Wages	£1,348 0 10
Fen-duities, Taxes, Coals, Gas, Insurance,	
Repairs and Furnishings	119 12 10
	<hr/>
	£1,467 13
2. FEE TO AUDITOR, 1890-91	50 0 0
3. FEE TO PRACTICAL ENGINEER	20 0 0
4. AGRICULTURAL EDUCATION (including Bursaries and Fees to Examiners)	265 8 6
5. CHEMICAL DEPARTMENT	814 14 1
6. VETERINARY DEPARTMENT	44 9 0
7. BOTANICAL DEPARTMENT	25 0 0
8. SPECIAL GRANTS	150 0 0
9. TRANSACTIONS	332 13 9
10. ESSAYS AND REPORTS	152 10 0
11. ORDINARY Printing, Advertising, Stationery, Postages, and Bank Charges	184 18 2
12. SUBSCRIPTIONS to Public Societies	25 0 0
13. MISCELLANEOUS	152 9 2
14. PREMIUMS—	
Stirling Show	£186 10 0
Inverness Show	1,566 3 8
District Competitions	220 7 4
Cottages and Gardens	9 6 8
	<hr/>
	1,982 7 8
15. PAYMENTS in connection with former Shows	15 14 8
16. SUBSCRIPTIONS towards Abortion Inquiry repaid	43 19 6
17. LIFE SUBSCRIPTION repaid	5 5 0
	<hr/>
	5,732 3 2
	<hr/>
BALANCE OF EXPENDITURE	£1,052 15 2

W. S. WALKER, *Treasurer.*

G. GRAHAM MONTGOMERY, *Member of Finance Committee.*

WM. HOME COOK, C.A., *Auditor.*

EDINBURGH, 3d January 1893.

ABSTRACT of the ACCOUNTS of the HIGHLAND and CHARGE.

1. DEPOSIT with Royal Bank of Scotland in name of "Building Fund," dated 11th November 1891	£117 18 4	
2. ARREARS of Subscriptions outstanding at 30th Nov. 1891	£54 10 0	
Whereof due by Members who have compounded for life, and are thereby extinguished	£11 7 6	
Sums ordered to be struck off	24 2 0	
	<u>35 9 6</u>	19 0 6
3. INTERESTS AND DIVIDENDS—		
(1) Interest on Heritable Bonds, less Income-tax	£852 15 6	
(2) Interest on Debenture Bonds, Do.	78 0 0	
(3) Interest on Debenture Stock, Do.	269 13 2	
	<u>£1,000 8 8</u>	
Deduct. — Interest on Overdraft on Account Current with Royal Bank of Scotland for year to 30th November 1892	12 18 5	
	<u>£987 10 3</u>	
(4) Dividend on Bank Stocks—		
£6,407 7 8 Royal Bank of Scotland	£576 13 2	
2,218 16 5 Bank of England	221 17 6	
2,000 0 0 British Linen Co. Bank	280 0 0	
1,250 0 0 National Bank of Scotland	187 10 0	
1,080 0 0 Commercial Bank of Scotland	151 4 0	
1,091 13 4 Bank of Scotland	141 18 4	
	<u>£14,047 17 5</u>	1,559 3 0
(5) Dividend on 10 shares, British Fisheries Society	10 0 0	2,556 13 3
4. INCOME from Building Fund—		
Interest on Deposit Receipt with Royal Bank of Scotland		1 18 7
5. SUBSCRIPTIONS—		
Annual Subscriptions	£737 10 0	
Life Members	563 13 6	
	<u>1,301 3 6</u>	
6. RECEIPTS in connection with former Shows	58 11 11	
7. TRANSACTIONS—Sales from Messrs Blackwood & Sons for year 1891	9 6 0	
8. SUM received from Government in aid of Agricultural Experiments	200 0 0	
9. BALANCE of Receipts from Inverness Show	613 15 9	
10. CAPITAL SUM realised	2,000 0 0	
11. BALANCE due to Royal Bank of Scotland on Account Current, at 30th November 1892	1,575 3 3	

SUM OF CHARGE £8,453 14 1

EDINBURGH, 3d January 1893.

AGRICULTURAL SOCIETY of SCOTLAND for the Year 1891-92.

DISCHARGE.

1. BALANCE due to Royal Bank of Scotland on Account Current at 30th Nov. 1891	£527 18 6	
2. ESTABLISHMENT EXPENSES—		
Salary to Secretary	£850 0 0	
Salary to late Clerk, £125; Clerk, £170, 3s. 4d.; Second Clerk, £40, 17s. 6d.	351 0 10	
Retiring Allowance to late Clerk, for half-year to 1st October 1892	75 0 0	
Wages to Messenger	72 0 0	
Feu-duty, £28; Water Rates, £2, 3s. 4d.; Taxes, £86, 8s. 4d.	60 0 8	
Coals and Firewood, £8, 4s. 6d.; Gas, £12, 8s.; Insurance, £8, 14s. 8d.	99 7 2	
Repairs and Furnishings	23 16 0	
		1,467 13 8
3. FEE to Auditor of Accounts for 1890-91	50 0 0	
4. FEE to Practical Engineer for year	20 0 0	
5. AGRICULTURAL EDUCATION—		
Grant to Professor of Agriculture, £150; Prizes to Class, £10; Bursaries, £60; Fees to Examiners, Expenses, and Luncheon, £45, 8s. 6d.	265 8 6	
6. CHEMICAL DEPARTMENT—		
Salary to Chemist, £200; Allowance for Expenses, £200	£400 0 0	
Experimental Station at Pumphreston—Superintendent's Allowance, £15, 15s.; Manures and Seeds, £13, 11s. 4d.	29 6 4	
District Experiments—Manures, &c., £177, 1s. 3d.; Grants for conducting Experiments, £36; Chemist's Travelling Expenses, £6, 7s.	210 8 3	
Potato Experiments—Experimenters' Outlays, £13, 14s.; Chemist's Travelling Expenses, £9, 9s. 6d.	23 8 6	
Grants to Analytical Associations	132 10 0	
Printing	10 6 0	
		814 14 1
7. VETERINARY DEPARTMENT—Fee to Professor Williams, £20, 5s.; Medals to Students, £18, 4s.	44 9 0	
8. BOTANICAL DEPARTMENT—Fee to Botanist for year	25 0 0	
9. SPECIAL GRANTS—Vote to Kilmarnock Dairy School, £60; Grant to Angus and Mearns Dairy School, £20; Grant to Royal Northern Society for Dairy Education, £20; Vote to Glasgow and West of Scotland Technical College, £50	150 0 0	
10. SOCIETY'S TRANSACTIONS—Printing, £194, 2s.; Binding and Postage, £136, 9s. 0d.; Delivering, £2, 2s.	332 18 9	
11. ESSAYS AND REPORTS	162 10 0	
12. ORDINARY Printing and Lithographing, £68, 0s. 6d.; Advertising, £24, 17s. 4d.; Stationery, Books, and Binding, £32, 0s. 9d.; Postage and Receipt Stamps, £56; Bank and Post-Office Charges and Telegrams, £8, 19s. 7d.	184 18 2	
13. SUBSCRIPTIONS to Public Societies—Scottish Meteorological Society, £20; Society for Prevention of Cruelty to Animals, 4s.	25 0 0	
14. MISCELLANEOUS EXPENSES—Award Indicators, £59, 10s. 9d.; Secretary's Expenses attending Meetings for Nomination of Directors, £21; Addressing Circulars, £2, 10s.; Luncheons to Directors, £14, 14s. 9d.; Reporting Meetings, £21; Tods, Murray, & Jamieson, W.S., Business Account in connection with Investment in Bank Stocks and Technical Education, £22, 5s. 2d.; Storing Turnstiles, £5; Repairing Turnstiles, £1, 12s.; Handbills, £1, 10s.; Removal and Storage of boxes, £1, 11s. 0d.; Bank Commission on Collection of Clyde Navigation Bonds, £1, 5s.; Fisher for Attendance at Board Meetings, 10s.	152 9 2	
15. PREMIUMS—		
Stirling Show	£186 10 0	
Inverness Show	1,560 8 8	
	£1,752 13 8	
District Competitions	220 7 4	
Outcrops and Gardens	9 6 8	
		1,982 7 8
16. PAYMENTS in connection with former Shows	15 14 8	
17. SUBSCRIPTIONS towards Abortion Inquiry repaid	43 19 6	
18. LIFE SUBSCRIPTION to holder of First-Class Certificate in Forestry repaid	5 5 0	
19. ARREARS of Subscriptions struck off as irrecoverable	30 9 0	
20. ARREARS considered recoverable	50 15 6	
21. CAPITAL Sum invested	1,500 0 0	
22. SUM on Deposit Receipt with Royal Bank of Scotland, dated 11th Nov. 1892	492 11 0	
23. SUM on Deposit Receipt with Royal Bank of Scotland, dated 11th November 1892, in name of "Building Fund"	119 16 11	
SUM OF DISCHARGE	£8,458 14 1	

W. S. WALKER, *Treasurer.*

G. GRAHAM MONTGOMERY, *Member of Finance Committee.*

WM. HOME COOK, C.A., *Auditor*

ABSTRACT of the ACCOUNTS

CHARGE.

1. LOCAL SUBSCRIPTIONS—

From the Counties of Inverness, Elgin, Nairn, Ross and Cromarty, Caithness, Sutherland, and Orkney including Shetland. £900 0 0

2. AMOUNT COLLECTED DURING SHOW—

Drawn at Gates	£1,438 1 0	
Drawn at Grand Stand	155 2 0	
Catalogues and Awards sold	134 14 0	
Drawn at Lavatory	2 7 0	
Drawn at Block-Test Competitions	19 3 0	
	<hr/>	1,749 7 0

3. RENT OF STALLS 1,161 14 6

4. RENT OF REFRESHMENT BOOTHS 200 0 0

5. INCOME OF TWEEDDALE MEDAL FUND 18 5 8

6. MANURE IN SHOWYARD 10 0 0

7. SUBSCRIPTIONS IN AID OF PREMIUMS 183 10 0

8. FINES FOR NON-EXHIBITION OF LIVE STOCK 32 10 0

9. INTEREST FROM ROYAL BANK 1 4 9

4,256 11 11

BALANCE OF PAYMENTS 952 7 11

£5,208 10 10

Note.—To the above Balance of £952 7 11
 There must be added the Premiums
 undrawn at 30th November 1892,
 amounting to 186 10 0

MAKING THE PROBABLE LOSS £1,086 17 11

EDINBURGH, 3d January 1893.

of the INVERNESS SHOW, 1892.

DISCHARGE.

1. SHOWYARD EXPENDITURE—			
Fitting up Showyard	£1,870	0	0
Rent of Park	60	0	0
Rosettes, Blue Tape, Arm Badges, &c.	23	0	0
Railway Carriages and Cartages of Turnstiles, Catalogues, &c.	19	11	3
Gratuity to Foremen Workmen	2	5	0
Miscellaneous	3	6	2
	£1,978	2	5
2. FORAGE AND BEDDING FOR STOCK	531	1	0
3. POLICE	70	9	10
4. TRAVELLING EXPENSES of Judges, Stewards, Secretary, and Assistants	144	2	10
5. HOTEL AND LODGINGS BILLS—			
23 Directors, 7 Stewards, 21 Judges, Secretaries, Auditor, and Veterinary Surgeon (including Sitting-Rooms and gratuities to servants)	£208	5	0
Clerks, Extra Assistants, and Attendants	38	6	6
Luncheons in Committee Room for Judges, Attending Members, and Members of Committee, and Breakfasts for Stewards, Assistants, &c.	86	6	4
Dinners to Post-Office Clerks and Catalogue Boys	2	15	6
		330	13 4
6. MUSIC in Showyard		29	12 6
7. PRINTING and Lithographing		156	2 0
8. ADVERTISING and Bill-posting		56	2 2
9. VETERINARY INSPECTOR		7	0 0
10. BEE EXHIBITION		21	1 0
11. ERECTING WORKING DAIRY		50	0 0
12. PRACTICAL ENGINEER—			
Fees, 13 days at £4, 4s. per day	£54	12	0
Personal and Travelling Expenses	23	15	0
		78	7 0
13. EXTRA CLERKS, Assistants, and Attendants at Turnstiles, Gates, &c.		151	0 9
14. POSTAGES		38	0 0
15. MISCELLANEOUS PAYMENTS		1	1 4
AMOUNT OF GENERAL EXPENSES	£3,642	16	2
16. PREMIUMS drawn at 30th November 1892	1,566	3	8
	£5,208	19	10

W. S. WALKER, *Treasurer.*G. GRAHAM MONTGOMERY, *Member of Finance Committee.*WM. HOME COOK, C.A., *Auditor.*

ABSTRACT of the ACCOUNTS of the ARGYLL NAVAL FUND for 1891-92.

CHARGE.

1. FUNDS as at 30th November 1891—			
Debenture Stock of the North British Railway Company	£1,200	0	0
Funded Debt of the Clyde Navigation Trustees, £3,000, purchased at	2,970	0	0
Stock of the Royal Bank of Scotland, £305, purchased at	671	0	0
Loan on Heritable Security at 4 per cent	1,200	0	0
			<u>£6,041 0 0</u>
BALANCE in Royal Bank of Scotland—			
On Deposit Receipt	£255	0	8
On Account Current	284	6	7
			<u>539 7 3</u>
2. INCOME received—			
			<u>£6,580 7 3</u>
On £1,200 North British Railway Company Debenture Stock at 4½ per cent, £51, tax £1, 5s 6d	£49	14	6
On £1,120 North British Railway Company Debenture Stock at 4 per cent, for half-year to Martinmas 1892, £22, 8s, tax 11s 3d.	21	16	9
On £3,000 Funded Debt of the Clyde Navigation Trustees at 4 per cent, £120, tax £3	117	0	0
On £305 Royal Bank Stock	27	9	0
On £1,200 lent on Heritable Security at 4 per cent, for half-year to Whitsunday 1892, when same realised, £24, tax 12s.	23	8	0
			<u>£239 8 3</u>
On Balances in Bank—			
On Deposit Receipt	£2	8	2
On Account Current	1	8	2
			<u>3 16 4</u>
			<u>243 4 7</u>
SUM OF CHARGE			<u><u>£6,823 11 10</u></u>

DISCHARGE.

1. ALLOWANCE to the five following Recipients—			
Colin Duncan Lorne MacEwan, second year	£40	0	0
Godfrey George Webster, third year	40	0	0
Colin Mackenzie, fourth year	40	0	0
C W Campbell Strickland, fourth year	40	0	0
Edward A Baird, eighth year	40	0	0
			<u>£200 0 0</u>
2. FUNDS as at 30th November 1892—			
£3,193, 6s 8d 3 per cent Debenture Stock of the North British Railway Company, purchased at	£2,650	0	0
<i>Note—£1,200 4½ per cent converted into</i>			
3 per cent Stock	£1,700	0	0
£1,120 4 per cent converted into			
3 per cent Stock	1,493	6	8
			<u>£3,193 6 8</u>
Funded Debt of the Clyde Navigation Trustees, £3,000, purchased at	2,970	0	0
Stock of the Royal Bank of Scotland, £305, purchased at	671	0	0
			<u>£3,291 0 0</u>
Balance in Royal Bank of Scotland on Account Current	332	11	10
			<u>6,623 11 10</u>
SUM OF DISCHARGE,			<u><u>£6,823 11 10</u></u>

W. S WALKER, *Treasurer*

G. GRAHAM MONTGOMERY, *Member of Finance Committee.*

WM HOME COOK, C A. *Auditor.*

APPENDIX (B).

PREMIUMS

OFFERED BY

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND IN 1893.

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GENERAL NOTICE.

THE HIGHLAND SOCIETY was instituted in the year 1784, and incorporated by Royal Charter in 1787. Its operation was at first limited to matters connected with the improvement of the Highlands of Scotland; but the supervision of certain departments, proper to that part of the country, having been subsequently committed to special Boards of Management, several of the earlier objects contemplated by the Society were abandoned, while the progress of agriculture led to the adoption of others of a more general character. The exertions of the Society were thus early extended to the whole of Scotland, and have, for the greater part of a century, been directed to the promotion of the science and practice of agriculture in all its branches.

In accordance with this more enlarged sphere of action, the original title of the Society was altered, under a Royal Charter, in 1834, to THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

The leading purposes of the Institution are set forth in the following pages, where it will be found that Premiums are offered for Reports on almost every subject connected with the cultivation of the soil; the rearing and feeding of stock; the management of the dairy; the improvement of agricultural machinery and implements; the growth of timber; the extension of cottage accommodation; the application of chemical science; and the dissemination of veterinary information.

Among the more important measures which have been effected by the Society are—

1. Agricultural Meetings and General Shows of Stock, Implements, &c., held in the principal towns of Scotland, at which exhibitors from all parts of the United Kingdom are allowed to compete.

2. A system of District Shows instituted for the purpose of improving the breeds of Stock most suitable for different parts of the country, and of aiding and directing the efforts of Local Agricultural Associations.

3. The encouragement of Agricultural Education, under powers conferred by a supplementary Royal Charter, granted in 1856, and authorising "THE COUNCIL of the HIGHLAND AND AGRICULTURAL SOCIETY ON EDUCATION" to grant Diplomas to Students of Agriculture; and by the establishment of Bursaries.

4. The appointment of a chemist for the purpose of promoting the application of science to agriculture, and to superintend local experiments. Also to subsidise, under certain conditions, Local Analytical Associations.

5. The advancement of the Veterinary Art, by conferring Certificates on Students who have passed through a prescribed curriculum, and who are found, by public examination, qualified to practise. Now terminated in accordance with arrangements with the Royal College of Veterinary Surgeons.

6. The establishment of a Botanical Department.

7. The establishment of a Dairy Department.

8. The appointment of a Board of Examiners, and the granting of First and Second Class Certificates in Forestry.

9. The annual publication of the 'Transactions,' which comprehend the Prize Reports, and reports of experiments, also an abstract of the business at Board and General Meetings, and other communications.

10. The management of a fund left by John, 5th Duke of Argyll (the original President of the Society) to assist young natives of the Highlands who enter Her Majesty's Navy.

CONSTITUTION AND MANAGEMENT.

THE general business of the HIGHLAND AND AGRICULTURAL SOCIETY is conducted under the sanction and control of a Royal Charter, which authorises the enactment of Bye-Laws. Business connected with Agricultural Education is conducted under the authority of a supplementary Royal Charter, also authorising the enactment of Bye-Laws.

The Office-Bearers consist of a President, Four Vice-Presidents, Thirty-two Ordinary and Twenty Extraordinary Directors, a Treasurer, an Honorary and an Acting Secretary, an Auditor, and other Officers.

The Directors meet on the first Wednesday of each month from November to June; seven being a quorum. The proceedings of the Directors are reported to General Meetings of the Society, held in January and in June or July.

With reference to motions at General Meetings, Bye-Law No. 10 provides—“That at General Meetings of the Society no motion or proposal (except of mere form or courtesy) shall be submitted or entertained for immediate decision unless notice thereof has been given a week previously to the Board of Directors, without prejudice, however, to the competency of making such motion or proposal to the effect of its being remitted to the Directors for consideration, and thereafter being disposed of at a future General Meeting.”

The Council on Education, under the Supplementary Charter, consists of Sixteen Members—Nine nominated by the Charter, and Seven elected by the Society. The Board of Examiners consists of Sixteen Members.

Candidates for admission to the Society must be proposed by a Member, and are elected at the half-yearly General Meetings in January and June or July, but it is not necessary that the proposer should attend the meeting. The ordinary subscription is £1, 3s. 6d. annually, which may be redeemed by one payment, varying, according to the number of previous annual payments, from £7, 1s. to £12, 12s. Proprietors farming the whole of their own lands, whose rental on the Valuation Roll does not exceed £500 per annum, and all Tenant-Farmers, Secretaries or Treasurers of Local Agricultural Associations, Factors resident on Estates, Land-Stewards, Foresters, Agricultural Implement Makers, and Veterinary Surgeons, none of them being also owners of land to an extent exceeding £500 per annum, are admitted on a subscription of 10s. annually, which may be redeemed by one payment, varying, according to the number of previous annual payments, from £3 to £5, 5s. Subscriptions payable on election, and afterwards annually in January. According to the Charter, “Any person elected an Ordinary Member of the Society who shall not have objected to his election, on the same being intimated to him by the Secretary, shall not be entitled to resign or withdraw his name as a Member of the Society, unless he shall have paid up his Life Subscription, or shall have previously settled and paid in Annual Contributions a sum equal to that fixed by the Society at the time of his election, to be paid by Members as the purchase of a Life Subscription in lieu and in redemption of the Annual Payments.” The Life Subscription for a Member paying £1, 3s. 6d. is £12, 12s., and for a Member paying 10s., £5, 5s. Members having candidates to propose are requested to state whether the candidate should be on the £1, 3s. 6d. or 10s. list.

Members of the Society receive the ‘Transactions’ free on application to the Secretary, and are entitled to consult the Chemist and Botanist at reduced rates—to apply for District Premiums—to report Ploughing Matches for the Medal—to free admission to the Showyard, and to exhibit Stock and Implements at reduced rates. Firms are not admitted as Members, but if one partner of a firm becomes a Member, the firm is allowed to exhibit at Members’ rates.

Orders, payable at the Royal Bank of Scotland, Edinburgh, are issued by the Directors, in name of the persons in whose favour Premiums have been awarded.

All communications must be addressed to “JAMES MACDONALD, Esq., Secretary of the Highland and Agricultural Society of Scotland, No. 8 George IV. Bridge, Edinburgh.”

ESTABLISHMENT FOR 1893.

President.

HIS ROYAL HIGHNESS THE DUKE OF YORK, K.G.

Vice-Presidents.

THE EARL OF ROSEBERRY, K.G., Dalmeny Park, Edinburgh.
 THE EARL OF DALKEITH, Dalkeith Palace, Dalkeith.
 LORD POLWARTH, Mertoun House, St Boswells.
 DUNCAN FORBES of Culloden, Inverness.

Ordinary Directors.

SIR JOHN STIRLING MAXWELL of Pollok, Bart., Pollokshaws.
 JOHN GILMOUE of Montrave, Leven, Fife.
 DONALD FISHER, Jellyholm, Alloa.
 R. G. WARDLAW RAMSAY of Whitehill, Tillicoultry House, Tillicoultry.
 G. WILKEN, Waterside of Forbes, Alford, N.B.
 JAMES LOCKHART, Mains of Airies, Stranraer.
 JOHN CRAN, Kirkton, Bunchrew, Inverness.
 THE HON. THE MASTER OF POLWARTH, Humbie House, Upper Keith.
 PATRICK STIRLING of Kippendavie, Dunblane.
 ROBERT ANDERSON of Lochdhu, Nairn.
 GEORGE R. GLENDINNING, Hatton Mains, Wilkieston.
 ALEXANDER M. GORDON of Newton, Inch, Aberdeenshire.
 JOHN M. AITKEN, Norwood, Lockerbie.
 W. S. FERGUSON, Pictstonhill, Perth.
 DAVID M'GIBBON, Ardnacraig, Campbeltown.
 WALTER ELLIOT, Hollybush, Galashiels.
 R. SINCLAIR SCOTT, Burnside, Largs.
 SIR ROBERT MENZIES of Menzies, Bart., Farleyer, Aberfeldy.
 ROBERT PATERSON, Hill of Drip, Stirling.
 SIR JAMES H. GIBSON-CRAIG of Riccarton, Bart., Currie.
 JOHN MARL, Cairnbrogie, Old Meldrum.
 REV. JOHN GILLESPIE, Mouswald Manse, Ruthwell, R.S.O.
 JONATHAN MIDDLETON, Clay of Allan, Fearn.
 GIDEON POTT of Dod, Knowesouth, Jedburgh.
 JOHN SPEIR, Newton Farm, Newton.
 GEORGE DUN, Easter Kincapple, St Andrews.
 SIR J. R. G. MATTLAND of Barnton, Bart., Craigend, Stirling.
 JAMES J. DAVIDSON, Saughton Mains, Gorgie, Edinburgh.
 W. H. LUMSDEN of Balmedie, Aberdeenshire.
 ANDREW LUSK, Lochvale, Dumfries.
 C. MACPHERSON GRANT of Drumduan, Forres.
 JOHN SCOTT DUDGEON, Longnewton, St Boswells.

Extraordinary Directors.

THE EARL OF WEMYSS AND MARSH, Gosford, Longniddry.
 THE RIGHT HON. JAMES ALEXANDER RUSSELL, Lord Provost of Edinburgh.
 SIR THOMAS D. GIBSON CARMICHAEL of Skirling, Bart., Castlecraig,
 Dolphinton.

ROBERT DUNDAS of Arniston, Gorebridge.
 Captain THOMAS HOPE of Bridge Castle, Bathgate.
 HENRY CALLANDER of Preston Hall, Dalkeith.
 Bailie WALCOT, 50 Northumberland Street, Edinburgh.
 WILLIAM FORD, Fentonbarns, Drem.
 JAMES HOPE, Eastbarns, Dunbar.
 ALEXANDER GLENDINNING, Newmains, Kirkliston.
 Sir ALLAN R. MACKENZIE of Glenmuick, Bart., Ballater.
 Captain G. D. CLAYHILLS HENDERSON of Invergowrie, R.N., Dundee.
 DAVID BUTTAR, Corston, Coupar-Angus.
 ALEXANDER MURDOCH, Gartcraig, Shettleston.
 ANDREW MACKENZIE, Dalmore, Alness, N.B.
 ALEXANDER MACDUFF of Bonhard, Perth.
 JOHN M. MARTIN of Auchendennan, Alexandria, N.B.
 CHARLES HOWATSON of Dornel, Glenbuck.
 R. SHIRRA GIBB, Boon, Lauder.
 JOHN BALLINGALL, Dunbog, Newburgh, Fife.

Office-Bearers.

Sir WILLIAM STUART WALKER, K.C.B., *Treasurer*.
 Sir G. GRAHAM MONTGOMERY of Stanhope, Bart., *Honorary Secretary*.
 JAMES MACDONALD, *Secretary*.
 Rev. ARCHIBALD SCOTT, D.D., *Chaplain*.
 ANDREW P. AITKEN, D.Sc., *Chemist*.
 WILLIAM HOME COOK, C.A., *Auditor*.
 TODS, MURRAY, & JAMIESON, W.S., *Law Agents*.
 A. N. M'ALPINE, *Consulting Botanist*.
 JAMES D. PARK, *Practical Engineer*.
 JOHN MACDIARMID, *Clerk*.
 EDWARD M. COWIE, *Second Clerk*.
 GOURLAY STEELL, R.S.A., *Animal Portrait Painter*.
 WILLIAM WILLIAMS, F.R.C.V.S., *Professor of Veterinary Surgery*.
 THOMAS WALLEY, M.R.C.V.S., *Professor of Cattle Pathology*.
 WILLIAM BLACKWOOD & SONS, *Printers and Publishers*.
 G. WATERSTON & SONS, *Stationers*.
 JAMES CRICHTON & Co., *Silversmiths and Medallists*.
 JOHN WATERSTON & SONS, *Inspectors of Works*.
 WILLIAM SIMPSON, *Messenger*.

Chairmen of Committees.

1. *Argyll Naval Fund*, . . . Captain G. D. CLAYHILLS HENDERSON of Invergowrie, R.N.
2. *Chemical and Botanical*, . . . G. R. GLENDINNING, Hatton Mains, Wilkie-ston.
3. *Dairy*, . . . JAMES M'QUEEN of Crofts, Dalbeattie.
4. *District Shows, and Cottages and Gardens*, . . . The MASTER OF POLWARTH, Ilumbie House.
5. *Finance, Hall and Chambers, and Law*, . . . JAMES AULDJO JAMIESON, W.S., 66 Queen Street, Edinburgh.
6. *Forestry and Highland Industries*, . . . Sir ROBERT MENZIES, Bart., Farleyer, Aberfeldy.
7. *General Shows*, . . . Sir JAMES H. GIBSON-CRAIG, Bart.
8. *Machinery*, . . . JONATHAN MIDDLETON, Clay of Allan, Fearn.
9. *Publications, Ordnance Survey, and Reports of Meetings*, . . . Rev. JOHN GILLESPIE, Mouswald Manse, Ruthwell, R.S.O.
10. *Veterinary*, . . . R. G. WARDLAW RAMSAY of Whitehill.

General Meetings.—By the Charter the Society must hold two General Meetings each year, and, under ordinary circumstances, they are held on the third Wednesday of the months of January and June, at one o'clock, in the Society's Hall, 3 George IV. Bridge, for the election of Members and other business.

Meeting at Edinburgh.—By a resolution of the General Meeting on 15th January 1879, a General Meeting of Members is held in the Show-yard on the occasion of the Annual Show. This year it will be held at Edinburgh, on Wednesday, 26th July, at 12.

General Show at Edinburgh—25th, 26th, 27th, and 28th July. —Entries close for Implements, 22d May—Stock, Poultry, and Dairy Produce, 19th June.

Directors' Meetings.—The Board of Directors meet on the first Wednesday of each month from November till June inclusive, at one P.M., and occasionally as business may require, on a requisition by three Directors to the Secretary, or on intimation by him.

Nomination of Directors.—Meetings of Members, for the purpose of nominating Directors to represent the Show Districts on the Board, will be held at the places and on the days after mentioned :—

1. Glasgow, North British Station Hotel, . . . Wednesday, 2d Aug., at 1.
2. Perth, Salutation Hotel, Friday, 4th August, at 2.
3. Stirling, Golden Lion Hotel, Friday, 18th August, at 1.
4. Edinburgh, 3 George IV. Bridge, Wednesday, 23d Aug., at 2.
5. Aberdeen, Imperial Hotel, Friday, 25th Aug., at 12.
6. Dumfries, King's Arms Hotel, Wednesday, 30th Aug., at 1.
7. Inverness, Caledonian Hotel, Friday, 1st Sept., at 12.30.
8. Kelso, Secretary's Tent, Ram Sale Ground, Friday, 8th Sept., at 1.

The nomination of Proprietors or other Members paying the higher subscription must be made in the 1st, 2d, 4th, and 8th Districts; and the nomination of Tenant-Farmers or other Members paying the lower subscription, in the 3d, 5th, 6th, and 7th Districts.

Committee Meetings.

Forestry and Highland Industries.—First Tuesday in November, at 12.30 noon.

Machinery.—First Tuesday in November, at 1.15 P.M.

General Shows.—First Tuesday in November, at 2 P.M.

Publications, Ordnance Survey, and Reports of Meetings.—First Wednesday in January, at 12 noon, and first Wednesday in November, at 12 noon.

District Shows, and Cottages and Gardens.—First Tuesday in December, at 12 noon.

Chemical and Botanical.—First Tuesday in March, and first Tuesday in December, at 2 P.M.

The other Standing Committees—**ARGYLL NAVAL FUND; FINANCE, HALL AND CHAMBERS, AND LAW; DAIRY AND VETERINARY,** meet when required.

Examinations for the Society's Diploma and Certificate in Agriculture and Certificates in Forestry are fixed to be held on the 22d, 23d, and 24th March.

COMMITTEES FOR 1893.

1. ARGYLL NAVAL FUND.

Captain G. D. CLAYHILLS HENDERSON of Invergowrie, R.N., Dundee,
Convener.
 Sir DAVID BAIRD of Newbyth, Bart., Prestonkirk.
 DUNCAN FORBES of Culloden, Inverness.
 Sir ROBERT MENZIES of Menzies, Bart., Farleyer, Aberfeldy.

2. CHEMICAL AND BOTANICAL.

G. R. GLENDINNING, Hatton Mains, Wilkieston, *Convener.*
 R. SHIRRA GIBB, Boon, Lauder, *Vice-Convener.*
 The MASTER OF POLWARTH, Humble House, Upper Keith.
 JOHN M. AITKEN, Norwood, Lockerbie.
 Prof. BAYLEY BALFOUR, Inverleith House.
 DAVID BUTTAR, Corston, Coupar-Angus.
 Dr CLEGHORN of Stravithy, St Andrews.
 W. S. FERGUSON, Pictstonhill, Perth.
 GEORGE HENDERSON, Upper Keith.
 JONATHAN MIDDLETON, Clay of Allan, Fearn, Ross-shire.
 JAMES M'QUEEN of Crofts, Dalbeattie.
 R. G. WARDLAW RAMSAY of Whitehill.
 JOHN SPEIR, Newton Farm, Newton, Glasgow.
 DAVID WILSON, yr. of Carbeth, Killearn.
 CHARLES HOWATSON of Dornel, Glenbuck.
 Dr AITKEN, Chemist, *ex officio.*
 A. N. M'ALPINE, Botanist, *ex officio.*

3. DAIRY.

JAMES M'QUEEN of Crofts, Dalbeattie, *Convener.*
 ANDREW ALLAN, Munnoch, Dalry, Ayr.
 Rev. JOHN GILLESPIE, Mouswald Manse, Ruthwell, R.S.O.
 JAMES LOCKHART, Mains of Airies, Stranraer.
 ANDREW RALSTON, Glamis House, Forfar.
 AUGUSTUS W. CRUIKSHANK, of Langley Park, Montrose.
 ROBERT PATERSON, Hill of Drip, Stirling.
 JOHN M. AITKEN, Norwood, Lockerbie.
 ANDREW LUSK, Lochvale, Dumfries.
 R. G. WARDLAW RAMSAY, Tillicoultry House, Tillicoultry.
 Dr AITKEN, Chemist, 8 Clyde Street, Edinburgh.

4. DISTRICT SHOWS, AND COTTAGES AND GARDENS.

The MASTER OF POLWARTH, Humble House, Upper Keith, *Convener.*
 W. H. LUMSDEN of Balmedie, Aberdeen.
 DAVID BUTTAR, Corston, Coupar-Angus.
 JOHN BALLINGALL, Dumbog, Newburgh, Fife.
 JOHN CRAN, Kirkton, Bunchrew, Inverness.

WALTER ELLIOT, Hollybush, Galashiels.
 G. R. GLENDINNING, Hatton Mains, Wilkieston.
 CHARLES HOWATSON, House of Glenbuck, Glenbuck.
 ALEX. MURDOCH, Gartcraig, Shettleston.
 W. S. FERGUSON, Pietstonhill, Perth.
 DAVID M'GIBSON, Ardnacraig, Campbeltown.
 WILLIAM FORD, Fentonbarns, Drem.
 JAMES LOCKHART, Mains of Airies, Stranraer.
 GEORGE DUN, Easter Kincaple, St Andrews.
 JAMES J. DAVIDSON, Saughton Mains, Gorgie, Edinburgh.

5. FINANCE, HALL AND CHAMBERS, AND LAW.

JAMES AULDJO JAMIESON, W.S., 66 Queen Street, Edinburgh, *Convener*.
 Sir JAMES H. GIBSON-CRAIG of Riccarton, Bart., *Vice-Convener*.
 Rev. JOHN GILLESPIE, Mouswald Manse, Ruthwell, R.S.O.
 ALEX. MACDUFF of Bonhard, Perth.
 PATRICK STIRLING of Kippendavie, Dunblane.
 G. R. GLENDINNING, Hatton Mains, Wilkieston.
 JOHN SCOTT DUDGEON, Longnewton, St Boswells.
 Sir WILLIAM S. WALKER, K.C.B., 5 Manor Place, *ex officio*.
 Sir G. GRAHAM MONTGOMERY of Stanhope, Bart., Stobo Castle, *ex officio*.
 WILLIAM HOME COOK, C.A., Auditor, *ex officio*.

6. FORESTRY AND HIGHLAND INDUSTRIES.

Sir ROBERT MENZIES, Bart., Farleyer, Aberfeldy, *Convener*.
 Sir ALLAN R. MACKENZIE of Glenmuick, Bart., Ballater.
 Sir JAMES R. G. MAITLAND of Barnton, Bart., Craigend, Stirling.
 WILLIAM ANDERSON SMITH, Ledaig, Argyllshire.
 Dr CLEGGHORN of Stravithy, St Andrews.
 DUNCAN FORBES of Culloden, Inverness.
 C. MACPHERSON GRANT of Drumduan, Forbes.
 JOHN METHVEN, 15 Princes Street, Edinburgh.
 Sir ALEXANDER MUIR MACKENZIE of Delvine, Bart., Dunkeld.
 Col. F. BAILEY, 7 Drummond Place, Edinburgh.
 JOHN GILMOUR of Montrave, Leven.
 JAMES AULDJO JAMIESON, W.S., 66 Queen Street, Edinburgh.
 LEWIS BAYNE, Jeanie Bank, Old Scone, Perth.
 JOHN ORD MACKENZIE of Dolphinton, 9 Hill Street, Edinburgh.

7. GENERAL SHOWS.

Sir JAMES H. GIBSON-CRAIG of Riccarton, Bart., Currie, *Convener*.
 Sir ALLAN R. MACKENZIE of Glenmuick, Bart., Ballater, *Vice-Convener*.
 Sir ROBERT MENZIES, Bart., Farleyer, Aberfeldy.
 PATRICK STIRLING of Kippendavie, Dunblane.
 DAVID BUTTAR, Corston, Coupar-Angus.
 JOHN CRAN, Kirkton, Bunchrew, Inverness.
 WALTER ELLIOT, Hollybush, Galashiels.
 WILLIAM FORD, Fentonbarns, Drem.
 Rev. JOHN GILLESPIE, Mouswald Manse, Ruthwell, R.S.O.
 JOHN GILMOUR of Montrave, Leven.
 C. MACPHERSON GRANT of Drumduan, Forbes.
 CHARLES HOWATSON, House of Glenbuck, Glenbuck.
 W. H. LUMSDEN of Balmedie, Aberdeen.
 ALEX. MACDUFF of Bonhard, Perth.
 ANDREW MACKENZIE, Dalmore, Alness.
 JOHN MARR, Cairnbrogie, Old Meldrum.
 ALEX. MURDOCH, Gartcraig, Shettleston.
 JAMES LOCKHART, Mains of Airies, Stranraer.

G. WILKEN, Waterside of Forbes, Alford, N.B.
 The Hon. The MASTER OF POLWARTH, Humber House, Upper Keith.
 JONATHAN MIDDLETON, Clay of Allan, Fearn.
 JOHN M. MARTIN of Auchendennan.
 DAVID M'GIBBON, Ardnacraig, Campbeltown.
 R. SINCLAIR SCOTT, Craigievar, Skelmorlie.
 W. S. FERGUSON, Pictstonhill, Perth.
 JAMES HOPE, East Barns, Dunbar.
 GEORGE DUN, Easter Kincapple, St Andrews.
 ALEX. M. GORDON of Newton, Inch, Aberdeenshire.
 JAMES D. PARK, Engineer, *ex officio*.

8. MACHINERY.

JONATHAN MIDDLETON, Clay of Allan, Fearn, *Convener*.
 JOHN SCOTT DUDGEON, Longnewton, St Boswells.
 WALTER ELLIOT, Hollybush, Galashiels.
 DONALD FISHER, Jellyholm, Alloa.
 A. S. LOGAN, Ferney Castle, Reston.
 JOHN MARSHALL, Maybole.
 J. T. S. PATERSON, 55 Grange Loan, Edinburgh.
 JOHN YOUNG, jun., Ayr.
 R. SHIRRA GIBB, Boon, Lauder.
 G. R. GLENDINNING, Hatton Mains, Wilkieston.
 JAMES D. PARK, Engineer, *ex officio*.

9. PUBLICATIONS, ORDNANCE SURVEY, AND REPORTS OF MEETINGS.

Rev. JOHN GILLESPIE, Mouswald Manse, Ruthwell, R.S.O., *Convener*.
 R. SCOT SKIRVING, 29 Drummond Place, Edinburgh, *Vice-Convener*.
 Dr A. P. AITKEN, 8 Clyde Street, Edinburgh.
 Dr CLEGHORN of Stravithy, St Andrews.
 R. G. WARDLAW RAMSAY of Whitehill.
 JOHN SCOTT DUDGEON, Longnewton, St Boswells.
 J. M. AITKEN, Norwood, Lockerbie.
 C. MACPHERSON GRANT of Drumduan, Forres.
 R. SHIRRA GIBB, Boon, Lauder.

10. VETERINARY.

R. G. WARDLAW RAMSAY of Whitehill, *Convener*.
 Sir JAMES H. GIBSON-CRAIG of Riccarton, Bait.
 WALTER ELLIOT, Hollybush, Galashiels.
 WILLIAM FORD, Fentonbarns, Drem.
 G. R. GLENDINNING, Hatton Mains, Wilkieston.
 ALEX. M. GORDON of Newton, Inch, Aberdeenshire.
 JOHN GILMOUR of Montrave, Leven.
 ANDREW MACKENZIE, Dalmore, Alness.
 PATRICK STIRLING of Kippendavie, Dunblane.
 GEORGE J. WALKER, Portlethen, Aberdeen.
 Professor WILLIAMS, *ex officio*.

The President, Vice-Presidents, the Treasurer, and Honorary Secretary are members *ex officio* of all Committees.

AGRICULTURAL EDUCATION.

CERTIFICATE AND DIPLOMA IN AGRICULTURE.

COUNCIL ON EDUCATION.

By a Supplementary Charter under the Great Seal, granted in 1856, the Society is empowered to grant Diplomas.

Members of Council named by Charter.

The PRESIDENT of the HIGHLAND AND AGRICULTURAL SOCIETY—*President.*
The LORD JUSTICE-GENERAL—*Vice-President.*

The LORD ADVOCATE.
The DEAN OF FACULTY.
The PROFESSOR OF AGRICULTURE.
The PROFESSOR OF ANATOMY.

The PROFESSOR OF BOTANY.
The PROFESSOR OF CHEMISTRY.
The PROFESSOR OF NATURAL HISTORY.

Members of Council nominated by Society.

The MASTER OF POLWARTH.
Sir JAMES H. GIBSON-CRAIG of
Riccarton, Bart.
R. G. WARDLAW RAMSAY of
Whitehill.
W. J. MAXWELL, yr. of Munches,
M.P., Terraughtie, Dumfries.

Rev. JOHN GILLESPIE, Mous-
wald, Ruthwell, R.S.O.
J. M. MARTIN of Auchendennan,
Alexandria, N.B.
JOHN MAIR, Cairnbrogie, Old
Meldrum.

Board of Examiners.

1. *Science and Practice of Agriculture.*—Professor WALLACE, University, Edinburgh; JAMES HOPE, East Barns, Dunbar; JAS. BIGGAR, yr. of Chapelton, Dalbeattie; and Professor WRIGHT, Glasgow and West of Scotland Technical College, 38 Bath Street, Glasgow.
2. *Botany.*—Dr CLEGHORN of Stravithy, St Andrews, and A. N. M'ALPINE, Edinburgh.
3. *Chemistry.*—Dr A. P. AITKEN, Edinburgh, and Dr WILLIAM CRAIG, Edinburgh.
4. *Natural History.*—Professor COSSAR EWART, Edinburgh, and Dr RAMSAY H. TRAQUAIR, Edinburgh.
5. *Veterinary Science.*—Professor WILLIAMS, Edinburgh, and FINLAY DUN, F.R.C.V.S., Edinburgh.
6. *Field-Engineering.*—DAVID ALAN STEVENSON, C.E., Edinburgh, and A. W. BELFRAGE, C.E., Edinburgh.
7. *Book-keeping.*—WILLIAM HOME COOK, C.A., Edinburgh, and J. WILSON BRODIE, C.A., Edinburgh.

Standing Acting Committee.

The LORD JUSTICE-GENERAL—*Convener.*

The PROFESSOR OF AGRICULTURE.
The PROFESSOR OF BOTANY.
The PROFESSOR OF CHEMISTRY.

Rev. JOHN GILLESPIE of Mouswald.
R. G. WARDLAW RAMSAY of
Whitehill.

BYE-LAWS.

I. That, in terms of the Charter, the Society shall nominate seven members to act on the Council on Education.

II. That the Council shall appoint a Board of Examiners on the following subjects :—Science and Practice of Agriculture ; Botany ; Chemistry ; Natural History ; Veterinary Science ; Field-Engineering ; and Book-keeping.

III. That the examinations shall be both written and oral, that the value of the answers shall be determined by numbers, and that the oral examinations shall be public.

IV. That there shall be two examinations,¹ to be styled respectively the "First-Class Certificate Examination" and the "Diploma Examination."

V. That to pass the "First-Class Certificate Examination," a candidate must be acquainted with the science and practice of agriculture, botany, chemistry, natural history, veterinary science, field-engineering, and book-keeping ; and that a certificate in the following terms, bearing the corporate seal and arms of the Society, signed by the President or Vice-President of the Council on Education, the Examiners, and by the Secretary, shall be granted to candidates passing this examination :—

"These are to certify that on the _____, A. B. was examined, and has been found to possess a knowledge of the science and practice of agriculture, botany, chemistry, natural history, veterinary science, field-engineering, and book-keeping."

VI. That to pass the "Diploma Examination," a candidate must possess a *thorough knowledge* of the science and practice of agriculture, botany, chemistry, natural history, veterinary science, field-engineering, and book-keeping ; and that a diploma in the following terms, bearing the corporate seal and arms of the Society, and signed by the President and Vice-President of the Council on Education, the Examiners, and by the Secretary, shall be granted to candidates passing this examination :—

"These are to certify that on the _____, A. B. was examined, and has been found to be proficient in the science and practice of agriculture, botany, chemistry, natural history, veterinary science, field-engineering, and book-keeping."

VII. That each successful candidate for the Society's Agricultural Diploma shall thereby become eligible to be elected a free life member of the Society.

VIII. That a Standing Acting Committee of the Council on Agricultural Education shall be appointed by the Directors.

Note.—The list of Diploma Free Life Members is published in vol. v., fifth series, of the Society's 'Transactions.'

The following have obtained

FIRST-CLASS CERTIFICATES.

1867. *J. C. BOWSTEAD, Halkthorpe Hall, Penrith.	1875. JOHN SCOTT, Edinburgh.
1868. JAMES TAYLOR, Clashfarquhar, Aberdeen.	1876. CECIL C. BAKER, 2 Bloomsbury Place, London.
1873. *R. C. B. WILLIS, Cheltenham.	1876. *PERCY H. CATHCART, 16 Oakley Square, London.
1875. GEORGE H. CATT, 44 Middle Street, Brighton.	1876. JOHN M'CAIG, Kilhilt, Stranraer.
1875. ROBERT EWING, Reporter, late Edinburgh.	1876. C. E. M. RUSSELL, Balliolisk, Dollar.

¹ The examinations will be held this year on the 22d, 23d, and 24th March, candidates being required to lodge intimation before the 15th of March.

* Those marked with an asterisk * are Members of the Royal Agricultural College, Cirencester.

1878. W. M. ANDERSON, Pirntaton, Stow.
1879. *M. FALCON, Stainburn, Workington.
1880. WILLIAM BROWN, Watten Mains, Caithness.
1880. ALEX. INGLIS, Greenlawdean, Greenlaw.
1880. JAMES M'LAGGAN, Cobbleheugh, Dinnet, Aberdeenshire.
1880. R. A. MALLOCH, Balhaldie, Braco, Perthshire.
1881. DANIEL BAIN, Wick.
1881. *ALFRED HARDIE, Oxford House, Stockport.
1882. DANIEL FINLAYSON, Carter's, Seedsman, London.
1882. BENJAMIN HEPBURN, Preston Mains, Prestonkirk.
1882. J. RODGER, Minto Estate Office, Hawick.
1883. ALEXANDER H. GIBSON, Kirkcaldy.
1883. ARTHUR HERBERT KERN, Crookham, Farnham.
1883. *PATRICK L. MAITLAND, Perry-mead House, Bath.
1883. HENRY B. MAYNE, Brantridge, Balcomb, Sussex.
1883. ROBERT ROUSE PETER, Buenos Ayres, South America.
1884. *W. A. SANDERS, Sanders Park, Co. Cork.
1884. *W. STIRLING, Dean's Court, St Andrews.
1885. *HENRY CHAVASSE, Castle Townshend, Cork.
1885. A. R. DUNNET, Auchengill, Keiss, Caithness.
1885. ALEX. EDWARD, 1 Macdonald Street, Dundee.
1885. JOHN M. RAMSAY, Hope Park, Cupar-Fife.
1886. *BASIL S. CAVE, Queensberry House, Richmond, Surrey.
1886. *EDGAR DUDLEY, 37 Thornhill Road, Barnsbury, London.
1886. JOHN EDWIN MACKENZIE, 15 Albany Street, Edinburgh.
1886. *J. RENNIE, Wellerroft, Helensburgh.
1886. *WILLIAM R. RICHARDSON, Collyhurst Lodge, Whalley Range, Manchester.
1886. *C. G. FRIER THONGER, Lordswood Place, Harborne, Staffordshire.
1887. *KHOSHROO B. JADHAVA, Baroda, Bombay.
1887. *PANDIT SRILAL, Misra, Mahaban, Dist. Muthra, North - West Provinces, India.
1888. D. W. COLLYER, Cragnehan, Weston-super-Mare, Somerset.
1888. W. H. A. T. WATSON, 65 Eccleston Square, London, W.
1889. *ASH RUDD, East Ruston Hall, Stalham, Norwich.
1889. A. W. WOODBURN, 6 Sardinia Terrace, Hillhead, Glasgow.
1890. GEORGE CRUICKSHANK, Comisty, Huntly.
1890. GEORGE PEARSE FOADEN, Sparham House, Ashburton.
1890. JAMES WEIR, Woodilee Farm, Lenzie.
1891. CHARLES ARNISON, Ravenstone, Wordsworth Street, Penrith.
1891. R. G. CRASKE, 2 Beverley Road, Colchester.
1891. JAMES S. GORDON, Stragollen House, Strablane.
1891. WILLIAM HUIGHSON, 10 Dudhope Place, Dundee.
1891. GEORGE T. LUXTON, 136 London Road, Gloucester.
1891. JAMES MACKINNELL, Kilmartin, Lochgilphead.
1891. W. G. MASON, Marsh Grange, Kirby-in-Furness, Carnforth.
1891. M. H. WARD, Fernside, St Helens.
1892. PATRICK A. BELL, Auchtertyre, Newtyle, Coupar-Angus.
1892. ERNEST CLAYTON, Grimston Park, Tadcaster, Yorks.
1892. JAMES D. DUNN, Easthouse, Seaham Harbour.
1892. THOMAS PARKER GREENWOOD, Amington House, Tamworth.
1892. JAMES HUTTON, Benegal, Milnathort.
1892. JOSEPH T. DE LA MOTHE, Agricultural College, Aspatia.
1892. ROBERT S. SETON, Rampyards, Watten, Caithness.
1893. E. M. ARNOLD, Sunningdale, Bexley Heath, Kent.
1893. G. BERRY, Watermoor, Cirencester.
1893. R. S. CUNLIFFE, Edinburgh.
1893. H. S. DAINNE, Woolfall Hall Farm, Huyton, Liverpool.
1893. EDRIC DRUCE, Walthall Street, Clewe.
1893. ALEXR. GOODFELLOW, Todrig Farm, Greenlaw.
1893. H. F. HILL, Agricultural College, Aspatia.
1893. ARTHUR SHAW, Agricultural College, Aspatia.
1893. JOHN A. SIMPSON, The Orchard Banff.
1893. DAVID L. SMITH, Agricultural College, Aspatia.
1893. G. K. THOMAS, Agricultural College, Aspatia.
1893. C. J. R. TIPPER, Agricultural College, Aspatia.

SYLLABUS OF EXAMINATION

FOR CERTIFICATES AND DIPLOMA.

I.—SCIENCE AND PRACTICE OF AGRICULTURE.

1. Geological strata—surface geology—formation of soils—their classification—chemical and physical characters and composition—suitability for cultivation. 2. The principle of rotations—rotations suitable for different soils—systems of farming. 3. The composition of (a) manures—general and special—amounts used per acre—period and mode of application. The composition of (b) feeding substances—their suitability for different classes of farm stock—considerations affecting their use. 4. "How crops grow"—our farm crops—their cultivation—diseases—insect injuries and remedies—their chemical composition. The formation and management of plantations. 5. The principles on which drainage, irrigation, and warping operations should be based and carried out. The application of lime—marl—clay, &c. 6. Meteorology, or the laws of climate as affecting plant-life—the influence of light and heat on cultivation—of absorption and retention of heat and moisture—of porosity and capillarity in soils. 7. The breeding, rearing, feeding, and general treatment of farm stock—the different breeds of horses, cattle, sheep, and pigs—their characteristics—the districts where they are generally met with. 8. The machines and implements used in farming—their uses, prices, and the principal points to be attended to in their construction. 9. The "prime movers," or sources of power used in agriculture: man—horse—wind—water—steam—their relative values and advantages. *Text-books*—Morton's 'Cyclopedia of Agriculture,' Blackie & Son; Wallace's 'Farm Live Stock,' Oliver & Boyd; Harris's 'Cheese and Butter Maker's Handbook,' Dunn & Wright; McConnell's 'Agricultural Note-Book,' Crosby Lockwood & Son; 'Our Farm Crops,' Blackie & Son; 'How Crops Grow,' Macmillan & Co.; Warrington's 'Chemistry of the Farm,' Bradbury, Agnew, & Co.; M'Alpine's 'Grasses'; Geikie's 'Outlines of Geology.'

II.—BOTANY.

1. Nutritive Organs of Plants.—Root, stem, leaves. Functions of roots. Various kinds of stem, with examples. Use of the stem. Structure of leaves. Different kinds of leaves. Arrangement and functions of leaves. 2. Reproductive Organs.—Flower and its parts. Arrangements of the whorls of the flower—calyx, corolla, stamens, pistil. Ovule. Mature pistil or fruit. Pruning and grafting. Seed. Young plant or embryo. Sprouting of the seed, or germination. 3. General Principles of Classification.—Meaning of the terms Class, Order, Genus, and Species. Illustrations of natural orders taken from plants used in agriculture, such as grain-crops, grasses, clovers, vetches, turnips, mangel-wurzel, peas, beans, &c. Practical examination in fresh specimens and models; some of the latter may be seen in the Museum, at the Royal Botanic Garden, which is open daily to the public, free. *Text-book*—Balfour's 'Elements of Botany,' A. & C. Black, 1876, price 3s. 6d.

III.—CHEMISTRY.

The general principles of chemical combination. The chemistry of the more commonly occurring elements, and their more important compounds.

The chemical processes concerned in agriculture generally. The changes which take place in the germination, growth, and maturation of plants, in the weathering and manuring of soils, &c. The composition and chemical character of the common mineral manures. *Text-books*—Roscoe's 'Lessons in Elementary Chemistry,' Macmillan & Co., London, price 4s. 6d.; Johnston and Cameron's 'Elements of Agricultural Chemistry and Geology,' Johnston's 'How Crops Grow,' Macmillan & Co., London; Warington's 'Chemistry of the Farm,' Bradbury, Agnew, & Co., London.

IV.—NATURAL HISTORY.

1. ZOOLOGY.

1. The characters distinguishing the primary divisions of the Animal Kingdom. 2. The Orders of the Class Insecta. 3. The principal insects injurious to crops. 4. The animal parasites, external and internal, affecting domestic animals; their life-histories and position in the zoological scale. 5. The Chordate or Vertebrate Type, with its subdivisions. 6. The Orders of Mammalia, with special reference to the domestic and wild mammalia of Great Britain. *Text-book*—Nicholson's 'Introductory Text-Book of Zoology,' William Blackwood & Sons, Edinburgh and London.

2. GEOLOGY.

7. The various strata forming the earth's crust in their order of deposition. 8. Their influence on the surface-soils of the country. 9. The meaning and application of Disintegration, Drift, Alluvium, Dip, Strike, Fault. *Text-books*—Page's 'Introductory Text-Book of Geology' and Lyell's 'Students' Elements of Geology.'

V.—VETERINARY SCIENCE.

1. Anatomy of the digestive organs of horse and ox, describing their structural differences. 2. The process of digestion in the above animals, and food most proper for each in quantity and quality. 3. The management of stock before, at, and after parturition. The time of utero-gestation in the domesticated animals. 4. The general principles to be followed in the treatment of acute and common diseases before assistance of the veterinary surgeon can be procured. *Text-books*—'Youatt on Sheep,' price 7s. 6d.; Steel's 'Diseases of the Ox,' price 15s.; Williams's 'Principles and Practice of Veterinary Surgery,' price 30s.; Williams's 'Principles and Practice of Veterinary Medicine,' price 30s., MacLachlan & Stewart, Edinburgh.

VI.—FIELD-ENGINEERING.

1. Land-surveying with the chain. 2. Mensuration of areas of land, in imperial and Scotch acres, from a chain survey or from a plan. 3. Levelling with the ordinary levelling instrument and staff, and calculating levels and gradients. *Text-book*—'Elementary Treatise on Land and Engineering Surveying,' by T. Baker, C.E., Weale's Series, price 2s. Part i. chaps. 1, 2, 3, and 6, and part ii. chap. 1, to be read.

VII.—BOOK-KEEPING.

1. Questions in Practice and Proportion. 2. Book-keeping—Describe books to be kept; give examples—taking of stock. *Text-book*—Stephens' 'Practical System of Farm Book-keeping,' William Blackwood & Sons, Edinburgh, price 2s. 6d.

EXAMINATION PAPERS, 1893.

AGRICULTURE.

1. Given a farm of 600 acres of good arable land, 300 acres of which are down to pasture, a flock of breeding ewes, besides grazing and house-fed cattle being kept; give in detail the rotation you would adopt, estimate the amount of food you would produce, and the numbers of stock which would be required to consume it; and after stating the quantities and prices of the main products you would expect to sell, make up a profit and loss account for the year.

N.B.—You are at liberty to fix the rent which you think fair under the circumstances, to select the breed of ewes and the breed of cattle you would prefer to keep, and to consume the grain grown on the farm in preference to the purchase of cakes and other foreign or imported food-stuffs.

2. Describe in detail an approved method of making butter from cream, including the separation of the cream from milk, and contrast this with the system of working in which the whole milk is churned, stating advantages and disadvantages in each case.

3. Name the leading dairy breeds of cattle in the British Isles, and mention their leading characteristics. Point out for what conditions of farming each is best suited.

4. Describe in detail how you would proceed in laying down a field of somewhat poor and foul land to permanent pasture. Give the kinds and quantities of seeds to be sown, and describe the subsequent management of the field till the pasture is properly formed. Also give a mixture of seeds suitable for a two years' pasture, and give reasons why it differs from the mixture for permanent pasture.

5. Give details of cultivation and approximate cost of growing an acre of swedes on dry friable soil without farmyard manure, and state suitable methods of storing the roots for winter and spring consumption by cattle and sheep.

6. Give suitable mixture of manures for growing the following crops without unduly exhausting the soil:—swedes, potatoes, beans, barley or oats, hay.

7. Give details of the cultivation of potatoes: what crop they do best to follow, how much seed is required to plant an acre, what manures are the most suitable, and what would be the crop you would expect to grow on good land.

8. Take a farm of good land managed on a six-course shift, being hay, oats, potatoes, wheat, turnips, and barley; how much would the different crops yield per acre? Also say what straw you would expect to have per acre with the three corn crops.

(Three hours allowed.)

BOTANY.

1. Describe the structure and mode of growth of an ordinary dicotyledon, and how it mainly differs from a monocotyledon.

2. Describe the leaf of a vetch, and explain how each part is adapted to its special work.

3. Give two examples in cultivation of each of the following orders—English and botanical names:—

Cruciferae.

Umbelliferae.

Leguminosae.

Gramineae.

4. Indicate in tabular form the position of the Swedish turnip in the vegetable kingdom.

5. Describe the specimen given to you, beginning at the root, including the stem, leaves, flowers, and fruit.

(An hour and a half allowed.)

CHEMISTRY.

1. What is the composition of felspar? What are the changes which it undergoes in weathering?

2. Distinguish between lime, chalk, and gypsum. What are the properties which determine their value as manures? What are circumstances in which each may most appropriately be used to ameliorate the soil?

3. What are the compounds of iron commonly found in water? How may the presence of iron in a water be detected?

4. Distinguish between alcoholic, lactic, and butyric fermentations, and describe the conditions under which these are brought about.

5. How may tartaric acid be prepared from the juice of the grape?

6. What are the chief products obtained from the destructive distillation of wood? How may they be separated from each other?

(An hour and a half allowed.)

NATURAL HISTORY.

ZOOLOGY.

1. Refer the wireworm to its order, and give an account of its life-history, the nature of the damage done by it, and enumerate also the chief remedial measures.

2. Contrast the alimentary system, including teeth, in the pig, ox, and horse.

3. Refer the following animals to their respective classes and orders, and give your reasons for so doing: toad, owl, field-vole, weasel, shrew, cray-fish, snail.

GEOLOGY.

1. How does granite occur? What are the constituent minerals of ordinary granite? and give approximately the chemical composition of each.

2. What is meant by the terms "contemporaneous" and "intrusive," as applied to igneous rocks, and how may they be distinguished?

3. Explain the formation of rock-salt. In what geological horizon or horizons does this mineral occur in Great Britain?

4. What are Belemnites? What is their geological range?

(An hour and a half allowed.)

VETERINARY SURGERY.

1. Describe an attack of weed in the horse, the class of animals subject to it, and the preventive and curative treatment.

2. State the description and weight of food required per week for (a) a cart-horse in full work, (b) a half-bred shorthorn cow in full milk, and (c) the eight weeks rearing calf of such a cow. How should such a calf be fed if suffering from persistent diarrhoea?

3. Scab for six months has affected a flock of 500 head, of which 200 are ewes with their lambs two months old. Detail the treatment to be adopted in view of cure and preventing further spread of the disease.

4. Describe the causes, symptoms, and treatment of parturient apoplexy (milk fever) in the cow.

(An hour and a half allowed.)

MENSURATION AND FIELD-ENGINEERING.

NOTE.—Candidates must work out the questions on sheets of paper which will be supplied to them, which sheets must be signed by the candidate, and lodged, along with this examination paper, with the Secretary. The answers to the questions, excepting Nos. 4 and 7, are also to be filled in on this paper.

NOTE OF IMPERIAL MEASURE.

10,000 square links	=	1 square chain.		
625 do.	=	0.0625 do.	=	1 pole.
25,000 do.	=	2.5 do.	=	40 poles=1 rood.
100,000 do.	=	10 do.	=	160 do.=4 roods=1 acre.

The imperial is to the Scotch acre as 1 : 1.261 nearly.

1. Calculate the area of the enclosure A in imperial acres, roods, and poles, and also in acres and decimals.

2. Calculate the area of the triangular enclosure A B C in imperial acres and decimals, and also calculate the length of the side A B.

3. Measure by the scale the enclosure C, mark the measurements necessary to calculate the area from, in links on the paper, and calculate from them the area in imperial acres and decimals.

4. In the figure D, HE is an irregular boundary; FH a straight station-line; FH and EG perpendiculars to FG. Measure by the scale, and mark in links on the paper, the measurements required in order to survey the boundary HE.

5. Calculate from these measurements the area of the piece of land FHEG, in imperial acres and decimals.

6. The contents of a piece of land being 370 Scotch acres, required the area in imperial acres and decimals.

7. Write down, as if in a level-book, the staff-readings in feet and decimals shown in sketch section; then reduce the levels beginning at H, so as to calculate the heights of K, L, and M above datum line,—all in feet and decimals.

8. Calculate the gradients of rates of inclination of the ground between the points H and K, K and L, and L and M.

$$\text{Answer } \begin{cases} \text{H and K} = \\ \text{K and L} = \\ \text{L and M} = \end{cases}$$

(An hour and a half allowed.)

ARITHMETIC AND BOOK-KEEPING.

1. If 7 sheep cost £8, 13s. 3d. nett, how much would 679 sheep cost at the same rate?

2. The manager of a farm is engaged at £73 for a year of 365 days, and retains his situation from April 13 to September 7. What wages is due to him?

3. If $7\frac{1}{2}$ per cent be gained by selling butter at £4, 16s. 8d. per cwt., what was the prime cost of the butter per cwt.?

4. Find the average price of 25 qrs. wheat at 40s., 36 qrs. at 44s., 16 qrs. at 48s., 15 qrs. at 54s., and 18 qrs. at 60s.

5. Express $\frac{2}{5}$ as a decimal, and find the value of .9125 of a guinea.

6. An estate consisting of 130 acres at 15s. an acre, 200 acres at 12s. an acre, and 250 acres at 9s. an acre, is to be divided between two brothers, the elder getting the best ground, the younger however getting a greater quantity, so as to render the divisions of equal value. How much land will each receive?

7. Name the business books a farmer should keep in order to exhibit a correct state of his affairs at any time, and show the following transactions as the same should be recorded therein:—

Sept. 6. Sold at public sale 6 stots at £15, 10s. Sale charges, £1, 13s. 1d.

" " Paid into National Bank of Scotland, £91, 6s. 11d.

" 8. Sold 150 B.F. hogs to Adam Black at 27s. each nett. Charges, £2, 10s.

" " Paid to account of rent, £200.

" 10. Sale note and bank draft received for 900 lb. wool at 6½d. per lb. Charges, 25s. 1d.

" " Bought from Charles Davies a shorthorn bull at £25.

" " Day's expenses at market, 6s. 3d.

" 11. Drawn from bank, £95.

" " Paid half-yearly servants, £95.

" 23. Sold James Todd 65 qrs. barley at 32s., and took his bill at two months for the price, he paying me £2, 17s. 6d. to meet the discount.

" 24. Discounted above bill, and paid discount, £2, 14s. 3d.

" " Paid Macintosh Bros. for seeds £54, and for feeding-stuffs £50.

" " Petty expenses to-day, 4s. 3d.

" " Bought a horse-rake from Duncan Ross, and handed him a cheque for the amount, £8, 10s.

And detail briefly the procedure in bringing the books named to a balance, and how the profit or loss on any one year's working would be arrived at.

(An hour and a half allowed.)

VETERINARY DEPARTMENT.

The Society established a Veterinary Department in 1823, but by an arrangement made with the Royal College of Veterinary Surgeons, the Society's examination ceased in 1881. Holders of the Society's Veterinary Certificate are entitled to become Members of the Royal College of Veterinary Surgeons on payment of certain fees, without being required to undergo any further examination. The number of Students who have passed for the Society's Certificate is 1183.

In 1874, the Society resolved to vote annually eight silver medals for Class Competition to each of the two Veterinary Colleges in Edinburgh, and to the one in Glasgow.

FORESTRY DEPARTMENT.

The Society grants FIRST and SECOND CLASS CERTIFICATES in FORESTRY.

BOARD OF EXAMINERS.

1. *Science of Forestry and Practical Management of Woods*.—COLONNEL BAILEY, Lecturer on Forestry, Edinburgh University, 7 Drummond Place; Dr SOMERVILLE, Durham College of Science, Newcastle-on-Tyne; LEWIS BAYNE, Forester, Jeanie Bank, Old Scone, Perth; JAMES KAY, Forester, Bute Estate, Rothesay; J. GRANT THOMSON, Grantown, Strathspey.
2. *Elements of Botany*.—Dr CLEGHORN and Professor BAYLEY BALFOUR.
3. *Elements of Chemistry*.—Dr WM. CRAIG and Dr A. P. AITKEN, Edinburgh.
4. *Land and Timber Measuring and Surveying; Mechanics and Construction, as applied to Fencing, Drainage, Bridging, and Road-making*.—A. W. BELFRAGE, C.E., Edinburgh.
5. *Book-keeping and Accounts*.—WM. HOME COOK, C.A., Edinburgh.

Candidates must possess—1. A thorough acquaintance with the theory and practice of Forestry. 2. A general knowledge of the following branches of study, so far as these apply to Forestry: The Elements of Botany; Elementary Chemistry, especially as applied to Atmosphere, Water, Soil, and Vegetation; Land and Timber Measuring and Surveying; Mechanics and Construction, as applied to fencing, draining, bridging, and road-making; Implements of Forestry; Book-keeping and Accounts. The examinations are open to candidates of any age.

The following have obtained First-Class Certificates:—

GEORGE YOUNG WALL, M.R.A.C., Durham,	.	.	1870
WILLIAM BAILLIE, The Nurseries, Haddington,	.	.	1871
WILLIAM ROBERTSON, Forester's House, Lauder,	.	.	1871
PETER LONEY, Marchmont, Duns,	.	.	1873
JOHN M. AITKEN, Norwood, Lockerbie,	.	.	1880
RICHARD HENDERSON, Portland Estates Office, Kilmarnock,	.	.	1880
A. H. GIBSON, Kirkcaldy,	.	.	1882

ALEX. INGLIS, Greenlawdean, Greenlaw, . . .	1882
PETER REID, Port Ellen, Islay, . . .	1884
JOHN HARRIE WILSON, D.Sc., F.R.S.E., Royal Botanic Garden, Edinburgh, . . .	1884
CECIL HENRY HOOPER, M.R.A.C., Painshill, Cobham, Surrey, . . .	1886
WILLIAM SOMERVILLE, B.Sc., Prof. of Agriculture and Forestry, Durham College, Newcastle-on-Tyne, . . .	1886
JOHN BARDGITT, 1 Gayfield Street, Edinburgh, . . .	1887
WILFRED JAMES FLEET, Estate Office, Thurlow, Suffolk, . . .	1888
ARTHUR CHARLES FORBES, Knowefield, Carlisle, . . .	1888
A. J. FARQUHARSON, Newtyle, Forfarshire, . . .	1890
JOHN C. MENZIES, Bankhead, Duns, . . .	1891

The following have obtained Second-Class Certificates :—

JOHN M'EWEN, Yellow Cottage, Killin, . . .	1880
THOMAS BERWICK, 56 North Street, St Andrews, . . .	1885
DONALD C CAMERON GRANT, Southleigh, Murrayfield, . . .	1886
JOHN A. SAWYER, Horningham, Warrminster, Wilts, . . .	1891
H. W. TUCKER, Conduit Lodge, Blackheath, . . .	1893

SYLLABUS OF EXAMINATION.

I.—SCIENCE OF FORESTRY AND PRACTICAL MANAGEMENT OF WOODS.

1. Structure, formation, and ripening of Wood. Predisposing causes of decay. 2. Restoration of Wood-lands:—(1) Natural reproduction; (2) Artificial planting. 3. General management of plantations. Cropping by rotation. Trees recommended for different situations. 4. Season and methods of pruning, thinning, and felling. 5. Circumstances unfavourable to the growth of trees. 6. Mechanical appliances for conveying and converting timber. The different implements and tools used in planting, pruning, felling, barking, and working up timber-trees, or preparing them for sale. Construction of saw-mills. 7. Qualities and uses of chief indigenous timbers. 8. Management of nurseries. Seed-sowing. 9. Collection of forest produce. 10. Mammals, birds, and insects which are destructive to trees.

Books recommended.—‘Theory and Practice of Horticulture,’ Lindley; ‘Arboriculture,’ Grigor, 10s. 6d.; ‘Sylviculture,’ Bagueris, 5s.; ‘Conifera,’ Veitch; ‘Injurious Insects,’ Ormerod, 3s.; ‘Timbers, and how to know them,’ Hartig.

Candidates are also obliged to undergo a Practical Examination in Forestry.

II.—ELEMENTS OF BOTANY.

1. Nutritive Organs of Plants.—Root, stem, leaves. Functions of roots. Various kinds of stems, with examples. Use of the stem. Structure of leaves. Different kinds of leaves. Arrangement and functions of leaves. 2. Reproductive Organs.—Flower and its parts. Arrangement of the whorls of the flower—calyx, corolla, stamens, pistil. Ovule. Mature pistil or fruit. Pruning and grafting. Seed. Young plant or embryo. Sprouting of the seed or germination. 3. General Principles of Classification.—Meaning of the terms Class, Order, Genus, Species. Illustrations taken from common forest trees and shrubs. Practical examination on fresh specimens and

models. These may be seen in the Museum at the Royal Botanic Garden, which is open to the public. Candidates may consult Professor Balfour's 'Elements of Botany,' A. & C. Black, Edinburgh, 3s. 6d.; Oliver's 'Elementary Lessons in Botany,' London, 4s. 6d.

III.—CHEMISTRY.

Candidates are required to have an elementary knowledge of Chemistry, such as to enable them to classify the most commonly occurring elements and their most familiar compounds, and to describe their chief characters.

They will be examined more particularly on the following subjects:—

Atmosphere.—Its composition and physical properties,—the causes of changes in its temperature and pressure, and the measurement of these changes by means of the thermometer and barometer. The formation of rain and dew. Gases injurious to vegetation.

Water.—The effects of heat upon it; its movements, its solvent properties, the methods of regulating the supply of water by drainage and irrigation. The characteristics of rain-water, spring-water, and surface-water. The relations of water to the growth and health of plants, and to the climatic conditions of a district.

Soil.—The description and classification of soils, and their suitability to the growth of different descriptions of timber-trees. The composition of soils, with special reference to the constituents on which their fertility depends, or which are the cause of their sterility. The changes produced in the composition of soils by various physical operations, such as drainage, irrigation, mulching, removal of leaves, &c., and by liming, salting, and manuring.

Vegetation.—The influence of temperature, rainfall, altitude, aspect, and shelter upon the growth of trees. The conditions favourable to germination. The effects of light, heat, and ventilation upon the growth of trees.

Forest Products.—The preparation and chemical characters of charcoal, potashes, tar, and turpentine.

Preservation of Timber.—Creosoting, kyanising, &c.

Books recommended.—'First Principles of Agriculture,' Tanner (Macmillan & Co.); 'Physics Primer,' Balfour Stewart; 'Inorganic Chemistry,' by George Wilson (Chambers).

IV.—LAND AND TIMBER MEASURING AND SURVEYING; MECHANICS AND CONSTRUCTION AS APPLIED TO FENCING, BRIDGING, AND ROAD-MAKING.

1. The use of the level and measuring-chain. Measuring and mapping surface areas. 2. The measurement of solid bodies—as timber, stacked bark, fagots, &c., earthwork. 3. The different modes of fencing and enclosing plantations; their relative advantages, durability, cost of construction, and repairs. 4. The setting out and formation of roads for temporary or permanent use. 5. The construction of bridges over streams and gullies; of gates or other entrances. Strachan's 'Agricultural Tables,' Oliver & Boyd, Edinburgh, price 2s. 6d.; or Horton's Tables.

V.—BOOK-KEEPING AND ACCOUNTS.

1. Questions in Practice and Proportion. 2. Book-keeping—describe books to be kept; give examples. Taking of stock.

EXAMINATION PAPERS, 1893.

PRACTICAL FORESTRY.

1. What do you understand by duramen, alburnum, medullary ray, vessel, and resin duct? Describe generally the natural processes which the warmth of spring gives rise to, and which result in the formation of a new layer of wood.

2. What are the principal objects of thinning? At what stage of the wood's growth are they commenced? What is usually the best season for thinnings? What considerations would guide you in repeating them? What are the results of over-thinning?

3. If a mixed wood of spruce, Scotch pine, and larch were formed on deep loamy soil, how would you expect these trees to stand, as regards relative height, in 20 years? If the soil were sufficiently moist, but very shallow, how would this affect the case?

4. Describe the method of lifting plants (without balls of earth) from the nurseries; the precautions to be taken for their protection in transit and on arrival at their destination; and the method of planting in holes made with the spade or hoe.

5. What causes the black blotches which are so common on the leaves of the sycamore in late summer? Give a short account of the disease. Sketch the life-history of the pine saw-fly (*Lophyrus pini*), and indicate some remedial measures that may be taken in case of an attack by this insect.

(Two hours allowed.)

BOTANY.

1. Describe the method of absorption of food-materials by the roots of a forest-tree.

2. What is the structure of bark? How is it formed?

3. What is the use of the process of grafting? What conditions must be attended to in carrying it out?

4. Describe the structure of any leaf. What is the use of the leaf to a plant?

5. Describe the plant given to you—root, stem, leaf, and flower.

(An hour and a half allowed.)

CHEMISTRY.

1. What is the cause of the formation of dew? What are the conditions of air and soil favourable to the formation of dew? How may the amount of moisture in the air be determined?

2. Explain how it is that mulching improves the condition of soils.

3. What is meant by the term "Humus"? What are the circumstances favourable to its formation? Describe a few simple tests to show what are the chemical characters of the substance.

4. Why is it that grass and plants generally do not grow well below trees?

5. How is it that trees can flourish upon soils that are unable to grow cereal crops?

6. What are the chief changes brought about in soils by the removal of timber?

(An hour and a half allowed.)

LAND AND TIMBER MEASURING AND SURVEYING; MECHANICS AND CONSTRUCTION AS APPLIED TO FENCING, DRAINAGE, BRIDGING, AND ROAD-MAKING.

1. What is required so as to be certain of the correct adjustment of a spirit-level for accurate sights?

2. Make form of level-book on separate paper, with four sights marked with imaginary lengths and remarks.

3. Make sketch section of same to imaginary scale, marking on total heights from datum with the imaginary lengths from starting-point.

4. Describe the different kinds of fences, and where suitable, keeping expense in view.

5. Draw sketch of best construction for wooden gate.

6. Draw sketch of wooden bridge of 30 feet span over ravine above burn.

7. Describe method of road-making of permanent character of 30 feet width.

(Two hours allowed.)

ARITHMETIC AND BOOK-KEEPING.

1. A wood-merchant bought 129 loads of Quebec pine deals at 17s. 6½d. per load; at what price must he sell each load so as to gain 24 per cent?

2. (a) What is the rent of 35 acres, 3 roods, 20 poles of land at £3, 14s. 3d. per acre? (b) If 16 persons can be maintained for 60 days on £84, how much money would be required to support, in similar circumstances, 96 men for 365 days?

3. A post is $\frac{1}{2}$ in mud, $\frac{1}{4}$ in water, and 10 feet above water. What is the length of the post?

4. What is the solidity of a log of wood 20 feet long, 18 inches broad, and 14 inches thick?

5. Reduce 3 roods 27 poles to the decimal of an acre.

6. I sold some property which cost me £250, 10s. at a profit of 15 per cent; what did I receive for it?

7. A person is owing to A £300, B £400, 10s., C £620, 15s., D £150, 15s., and his whole assets amount to £184; what dividend will he be able to pay?

8. Describe briefly the books a forester ought to keep, and their nature and use.

(An hour and a half allowed.)

CHEMICAL DEPARTMENT.

Chemist to the Society—Dr A. P. AITKEN, Chemical Laboratory,
8 Clyde Street, Edinburgh.

The object of the Chemical Department is to promote the diffusion of a knowledge of Chemistry as applied to agriculture among the members of the Society, to carry out experiments for that purpose, to assist members who are engaged in making local experiments requiring the direction or services of a chemist, to direct members in regard to the use of manures and feeding stuffs, to assist them to put the purchase of these substances under proper control, and in general to consider all matters coming under the Society's notice in connection with the Chemistry of Agriculture.

MEMBERS' PRIVILEGES IN RESPECT OF ANALYSES.

The fees of the Chemist for analyses made for members of the Society shall be as follows :—

The estimation of *one* ingredient in a manure or feeding stuff, . . . 5s.

The estimation of *two* or *more* ingredients in . . . do. . . 10s.

These charges apply only to analyses made for agricultural purposes, and for the sole and private use of members of the Highland and Agricultural Society who are not engaged in the manufacture or sale of the substances analysed.

If the sample represents a substance bought under a guarantee, and if it is found to be notably deficient, the Chemical Committee shall take cognisance of such deficiency in the same manner as they do in the case of deficient manures and feeding stuffs supplied to members of analytical associations (see page 28), provided that the Society's regulations as regards sampling are carried out, and that the seller's guarantee accompanies the sample.

Also, that valuations of manures, according to the Society's scale of units (see page 38), shall be supplied in all cases in which the cash price asked by the seller accompanies the sample.

The following analyses are made for *five shillings* :—

Simple Nitrogenous Manures—viz., nitrate of soda, sulphate of ammonia, horn-dust, dried blood, meat-meal, shoddy, soot, &c.

Simple Phosphatic Manures—viz., mineral phosphates, phosphatic guano, basic slag, &c., superphosphate (soluble phosphate only).

Simple Potassic Manures—viz., sulphate of potash, muriate of potash, potashes, &c.

The following analyses are made for *ten shillings* :—

Manures—viz., all compound and mixed manures, e.g., bone-meal, dissolved bones, guanos, &c.

*Feeding Stuff*s—viz., oilcakes, meals, and compounds.

MISCELLANEOUS.

Analysis of water ¹ to determine purity, hardness, and fitness for domestic use	£1 0 0
Analysis of agricultural products—hay, grain, ensilage, roots, &c.	1 0 0
Analysis of soil, to determine fertility and recommendation of manurial treatment	2 0 0

¹ Bottles for water samples are sent from the laboratory on application.

Examination of food or viscera for metallic poison . . .	£2 0 0
Examination of food or viscera for alkaloid poison . . .	2 0 0

Samples should be sent (carriage paid) to Dr A. P. Aitken, 8 Clyde Street, Edinburgh.

INSTRUCTIONS FOR SELECTING SAMPLES FOR ANALYSIS.

MANURES.

Four or more bags should be selected for sampling. Each bag is to be emptied out separately on a clean floor, worked through with the spade, and one spadeful taken out and set aside. The four or more spadefuls thus set aside are to be mixed together until a uniform mixture is obtained. Of this mixture one spadeful is to be taken, spread on paper, and still more thoroughly mixed, any lumps which it may contain being broken down with the hand. Of this mixture two samples of about half a pound each should be taken by the purchaser or his agent, in the presence of the seller or his agent or two witnesses (due notice having been given to the seller of the time and place of sampling), and these samples should be taken as quickly as possible, and put into bottles or tin cases to prevent loss of moisture, and having been labelled, should be sealed by the samplers—one or more samples to be retained by the purchaser, and one to be sent to the chemist for analysis.

FEEDING STUFFS.

Samples of feeding compounds should be taken in a similar manner.

Samples of cake should be taken by selecting three cakes, breaking each across the middle, and from the broken part breaking off a segment across the entire breadth of the cake. The three segments thus obtained should be wrapped up and sealed by the samplers, and sent for analysis as in the case of manures, and three duplicate segments similarly sealed and labelled should be retained by the purchaser.

SOILS.

Dig a little trench about two feet deep, exposing the soil and subsoil. Cut from the side of this trench horizontal scrapings of the soil down to the top of the subsoil. Catch these on a clean board, and collect in this manner about one pound weight of soil taken from the whole surface of the section. Similar scrapings of subsoil immediately below should be taken and preserved separately. Five or six similarly drawn samples should be taken from different parts of the field, and kept separate while being sent to the chemist, that he may examine them individually before mixing in the laboratory.

VEGETABLE PRODUCTS.

Turnips, &c., 20 to 30 carefully selected as fair average bulbs.

Hay, straw, ensilage, &c., should be sampled from a thin section cut across the whole stack or silo, and carefully mixed about; about 2 lb. weight is required for analysis.

Grain should be sampled like manures.

DAIRY PRODUCE.

Milk.—Samples of milk from individual cows should be taken direct from the milk-pail. Average samples from a number of cows should be taken immediately after milking. Samples to be tested for adulteration should not be drawn from the bottom or taken from the top of standing milk, but they should be ladled from the vessel after the milk has been thoroughly mixed.

For most purposes a quart-bottle of milk is a large enough sample.

Butter and Cheese.—About quarter-pound samples are required.

WATERS.

Samples of water for analysis should not be put into ordinary wine bottles or stoneware jars stopped with corks, as these usually vitiate the samples. Clear glass Winchester quarts with glass stoppers should be used. Cases containing these, chemically cleaned, are forwarded from the laboratory on application.

Well-water should be allowed to run for some time before the sample is drawn.

Standing water from cisterns, tanks, ponds, &c., should be sampled by immersing the bottle entirely under the water, and holding it, neck upwards, about four inches below the surface.

Spring or stream water should be sampled in dry weather, by immersion, if possible; but if not deep enough for that purpose, a perfectly clean cup or glass should be used for transferring the water to the bottle.

When the bottle has been filled the stopper should be rinsed in the water before replacing.

Samples should be despatched to the laboratory *immediately* after being taken.

LOCAL ANALYTICAL ASSOCIATIONS.

I. With the view of encouraging, as well as regulating the conduct of, Local Analytical Associations, the Society contributes from its funds towards their expenses a sum not exceeding £250 annually.

II. The amount of such contribution is to each association at the rate of 10s. for each full analysis, and 5s. for each partial analysis¹ of manure or feeding stuff affected, or such proportion thereof as the above annual contribution may permit of. The pecuniary assistance thus offered is subject to the following conditions being complied with to the satisfaction of the Chemical Committee:—

1. That the rules of the association are submitted to and approved of by the Chemical Committee.

2. That it is a condition of participating in the grant that the association make analyses for members of the Highland and Agricultural Society, being farmers and not members of the local association, charging them the cost price to the association, less the amount recovered from the Society.

3. That the association is managed by a committee of practical farmers owning or occupying land in the district.

4. That the analyst employed is of acknowledged standing.

5. That the benefits of the grant apply only to analyses made for farmers, and that these subscribe towards the expenses of the association, subject to the exception in No. 2.

6. That each analysis represents at least one ton of bulk actually purchased and delivered to one or more members under guarantee, or at a specified price per unit of valuable ingredients.

7. That the analysis has been made from a sample drawn after delivery, in accordance with the published instructions of the Society, and that a sealed duplicate sample has been retained.

8. That all analyses are reported according to forms furnished by the Highland and Agricultural Society, and that valuations of manures, if any are made, are calculated on a uniform standard to be issued periodically by the Society, and at least once a-year.

III. (a) A general report regarding the analyses for which the Society has contributed payment is submitted to the general meeting in January, and full details concerning manures and feeding stuffs whose analyses

¹ A partial analysis is one in which only one important constituent has been determined by the chemist or guaranteed by the seller.

show any of the valuable constituents to be deficient to the extent of one-tenth of the amount guaranteed, or whose total deficiencies represent as much as one-tenth of the value of the manure or feeding stuff, are published in the 'Transactions.'

(b) In the case of every analysis showing the deficiency above described, the secretary of the association must obtain confirmation of the deficiency from the chemist. The deficiency having been confirmed, the duplicate sample must be forwarded to the Secretary of the Highland and Agricultural Society. A copy of the analysis must at once be sent to the seller, and any explanations received from him forwarded in due course to the Secretary of the Highland and Agricultural Society.

(c) Should the seller be dissatisfied with the results obtained by the analyst of the association, a further analysis may, at his option, be made from the duplicate sample by another analyst to be chosen by the Society, and at its cost if the further analysis exonerates the seller; if otherwise, at the seller's cost.

IV. The report of each analysis for which a grant is claimed must be sent to the Secretary of the Highland and Agricultural Society on or before the 1st November of each year, written on a schedule issued by the Society, and accompanied by a form of guarantee (also issued by the Society), which must be filled up and signed by the seller.

The schedules and guarantee forms are supplied by the Secretary of the Society on application, and no grant is given for any analysis whose schedule and guarantee form are not accurately filled up.

No grants will be given for analyses whose schedules are sent in later than 1st November.

The actual analytical reports of the association's analyst need not accompany the schedules, but must be forwarded if desired.

METHOD OF PROCEDURE TO BE FOLLOWED BY SECRETARIES AND MEMBERS OF ANALYTICAL ASSOCIATIONS APPLYING FOR GRANTS FROM THE HIGHLAND AND AGRICULTURAL SOCIETY.

1. When a member makes a purchase he must obtain from the seller an analytical guarantee, written and signed by the seller, upon a form supplied by the Society.

2. When the member receives delivery of the stuff bought, he must inform the seller of the time and place at which the samples are to be taken for analysis, so that he may have an opportunity of being present.

3. In sampling a manure or feeding stuff the Society's printed instructions for sampling must be strictly complied with.

4. The sample (if it is to be analysed) must be sent to the chemist within a week of the date of sampling, so that any deficiency may be immediately detected.

5. The chemist must be asked to send in his report of analysis within a fortnight after receiving the sample.

6. When an analysis shows the sample to be deficient to such an extent as to require investigation by the Society, the association's chemist must be asked to verify the accuracy of his analysis, and report the matter within a week.

7. When a deficiency has been confirmed the secretary of the association must immediately inform the seller thereof, and draw his attention to the provisions of Regulation III.

8. At the same time the duplicate sample must be sent to the Secretary of the Highland and Agricultural Society, and along with it must be sent the schedule relating to the purchase, and also the guarantee form, both accurately filled up in every particular.

9. Any correspondence that may ensue with the seller or buyer must be

forwarded to the Secretary of the Highland Society as soon as received, so that the Committee may be able to investigate the matter with full knowledge of all the details.

10. The schedules (accurately filled up) of all samples for which the association claims a grant, along with the signed guarantees appertaining to them, must be sent to the Secretary of the Highland and Agricultural Society on or before 1st November, or they will not be received.

MANURES—THEIR COMPOSITION AND CHARACTERISTICS.

Nitrate of Soda.—A most valuable nitrogenous manure. Perfectly soluble, and immediately available for the nourishment of the plant. Feebly retained by the soil. Rapidly goes down to the subsoil. Benefits deeply-rooting plants. *When much nitrate of soda is frequently applied and unaccompanied by other manures, the soil becomes rapidly exhausted.*

Good samples contain 95 per cent or upwards of pure nitrate of soda, equivalent to about 19 per cent of ammonia.

Sulphate of Ammonia.—A more concentrated nitrogenous manure than the preceding. Perfectly soluble, but not so rapid in its action as nitrate of soda. It is somewhat firmly retained by the soil, and not so liable as nitrate of soda to be washed out by heavy rains. It is therefore more suitable than nitrate for wet districts.

Good samples contain 95 per cent or more of pure sulphate of ammonia, equivalent to from about 24½ to 25 per cent of ammonia.

Dried Blood.—A nitrogenous manure, which differs from the above in being insoluble. It must be decomposed in the soil before it yields up its nitrogen to the plant, and this it does only slowly. The nitrogen is in the form of albumen, and is capable of yielding from 12 to 16 per cent of ammonia.

Horn-dust—Keronikon.—An insoluble nitrogenous manure, capable of yielding 15 to 17 per cent of ammonia. Slower than dried blood. Its efficacy as a manure increases the more finely it is ground.

Horn, when in the form of chips or coarse shavings, decomposes extremely slowly, and is not suitable for application as a manure.

Shoddy or Wool-waste.—An insoluble nitrogenous material used by manure manufacturers as a source of ammonia in dissolved manures. It is capable of yielding from 5 to 14 per cent of ammonia. It is a useful manure when dissolved, but not otherwise.

Leather.—A very insoluble nitrogenous material, yielding about 9 per cent of ammonia, used by manure manufacturers after being melted and ground, but of little value until it has been dissolved.

Peruvian Guano.—A general manure formed of the excrements of fish-eating birds, and containing nitrogenous compounds, phosphates, and potash.

High-class Peruvian guano is rich in nitrogenous matter, a large proportion of which is soluble. As formerly imported, it was capable of yielding from 8 to 12 per cent ammonia, part of which was derived from ammonia salts, and part (less than 1 per cent) from nitrates. Phosphates were low, seldom exceeding 30 per cent, but from one-quarter to one-half of the phosphates were soluble. The amount of potash was usually from 3 to 5 per cent. Not now imported.

Low-class Peruvian guano, as now imported, is poor in nitrogenous matter, yielding only from 3 to 5 per cent ammonia. The phosphates are correspondingly high—viz., from 30 to 50 per cent—but the proportion of soluble phosphate is much smaller than in high-class Peruvian guano. Potash occurs to a very small extent, viz., about 1 to 3 per cent.

Low-class guanos are formed originally from high-class guanos, by the washing out of soluble constituents by rain, &c., and their composition varies greatly according to the amount of washing they have undergone.

Genuine Peruvian guano frequently contains a large proportion of stony insoluble matter. It ought to be riddled before purchasing.

Fortified Peruvian Guano.—also called by various names, such as *improved, equalised, &c.*—Such guanos are mixtures, with low-class Peruvian guano for a basis. Sulphate of ammonia is added, and perhaps also other nitrogenous matter, to bring them up to the guaranteed analysis, say from 8 to 10 per cent ammonia.

Dissolved Peruvian Guano.—This is usually Peruvian guano dissolved in sulphuric acid, and fortified with sulphate of ammonia so as to make a strong, active manure.

Ichaboe Guano.—A true guano, but of recent formation. It is very rich in nitrogenous matter, which yields from 10 to 16 per cent of ammonia, but a large part of the nitrogenous matter is in the form of feathers, which are insoluble and of low manurial value, otherwise it resembles high-class Peruvian guano. The total phosphates vary from 18 to 30 per cent, of which from a fourth to a half is usually soluble. There is seldom as much as 2 per cent potash present.

Fish Guano.—Derived from fish-curing yards, and consisting of the heads and offal of fish, dried and ground. Properly speaking, it is not a guano. The name guano is properly applied only to the dung of birds and some other animals.

High-class fish guano contains nitrogenous matter, yielding from 10 to 12 per cent of ammonia, but it is in the form of insoluble albuminous compounds, which only slowly decompose and become available as plant-food. The phosphates range from 18 to 30 per cent, and are all insoluble.

Low-class fish guanos are substances like the preceding, but containing less nitrogenous matter and more phosphates. They are simply fish-bone manures, with somewhat more ammonia and less phosphate than ordinary bone-meal, and having no real resemblance to a guano.

Fish guanos are usually impregnated with fish-oil, which detracts from the value of the manure. The oil should not exceed 3 per cent.

Frey-Bentos Guano.—The dried and ground residue and *debris* of animals after the extraction of "Liebig's Extract." It is not a guano. There are various grades of this manure. One contains much bone matter, another a good deal of horn. They are slow manures. The best manure is derived from muscular fibre, yielding about 14 per cent ammonia and about 5 per cent phosphate. It is a strong nitrogenous manure, variously named.

Bone-meal.—Chiefly a phosphatic manure, but containing also nitrogenous matter. Phosphates range from 44 to 55 per cent, according to the purity of the bones, and are insoluble. The nitrogenous matter is capable of yielding from 4 to 5 per cent ammonia, and is also insoluble. The higher the phosphates the lower the ammonia, and *vice versa*. The finer ground it is the more speedy is its action.

Bone-dust.—A coarser ground bone than the preceding.

Crushed Bones.—Still coarser ground.

Steamed Bone Flour.—Bones which have been subjected to steam at high pressure for the extraction of glue or gelatine. The residue contains from 56 to 65 per cent phosphates, and from 1 to 2 per cent ammonia. It is white-coloured and friable, and can be crushed with the hand. It is able to be, and ought to be, ground to a fine flour.

Pure Dissolved Bones.—Bones dissolved in sulphuric acid. It contains usually less than 20 per cent soluble phosphate, about 10 to 20 per cent of insoluble phosphate, and yields about $3\frac{1}{2}$ per cent ammonia. A large proportion of the insoluble phosphate may consist of "precipitated" phosphate, which is quite as useful as soluble phosphate.

Pure Vitriolated Bones.—Bones which have been moistened with sulphuric acid, and thereafter allowed to heat in large heaps. It contains

less soluble phosphate and more ammonia than the preceding, and is usually made from more coarsely ground bones.

Dissolved Bone Manures.—These are compound manures, consisting of any mixture of phosphatic and nitrogenous materials which can be dissolved, with some admixture of bone, so as to produce a manure containing from 15 to 30 per cent soluble phosphates, and from 1 to 3 per cent ammonia. *Dissolved bone manures* frequently contain some bone material that has not been dissolved.

Superphosphates.—Phosphates dissolved with sulphuric acid. Their composition varies according to the richness of the phosphate from which they are made, and the extent to which they have been dissolved. If mixed with nitrate of soda, except in very small quantity, it causes loss from escape of nitrous fumes, which are injurious when breathed.

High-class superphosphates are made from phosphates containing a high percentage of phosphate of lime, and are very thoroughly dissolved. They should contain between 35 and 40 per cent soluble phosphate.

Low-class superphosphates usually contain 26 to 28 per cent soluble phosphate.

Mineral Phosphates exist in great variety, and contain very various proportions of phosphate of lime, viz., from 20 to 90 per cent. They are of use as manures only when they are ground to the finest flour.

Thomas-Slag, Basic Cinder, or Slag Phosphate Meal.—A substance obtained as a waste product in the dephosphorising of steel. It contains from 30 to 40 per cent phosphate of lime, and should be manufactured into a powder of extreme fineness, 80 per cent at least passing through No. 100 wire-cloth. It is more soluble and available for plant-food than ground mineral phosphates. It may be mixed with nitrate of soda, but *not with sulphate of ammonia*, because it contains caustic lime.

Compound Manures.—These are general manures containing nitrogenous matter, phosphates, and potash, and their value depends not only on the amounts of these constituents, but also on their fineness of division, their solubility, and the sources from which their ingredients are derived.

The general character of a few of the more common of these may be indicated thus :—

Turnip Compounds.—These usually contain from 25 to 35 per cent phosphates, of which the half or more is soluble, and nitrogenous matter, capable of yielding from 2 to 5 per cent of ammonia, and sometimes 1 or 2 per cent of potash.

Potato Compounds.—These are somewhat like the preceding, but contain usually less phosphate and a little more ammonia (from 4 to 8 per cent); sometimes they contain no potash, but more frequently about 3 or 4 per cent is present, and in some instances twice as much.

Bean Compounds.—These may contain from 10 to 20 per cent phosphates, nitrogenous matter yielding from 2 to 4 per cent of ammonia, and usually a considerable proportion of potash, often as much as from 10 to 20 per cent.

Cereal Compounds.—These usually contain about 20 per cent phosphates, mostly soluble, and nitrogenous matter, partly as nitrates, yielding from 3 to 8 per cent ammonia, and they may also contain potash.

Grass Compounds.—These are somewhat like the preceding, but may contain less phosphates and more nitrogen, part of which is usually in the form of nitrate.

NOTES REGARDING MANURIAL CONSTITUENTS.

The three important constituents of purchased manures are phosphates, nitrogenous matter, and potash salts.

The phosphates are described in analytical reports as containing phosphoric acid equal to so much "phosphate of lime"; the nitrogenous mat-

ter as containing nitrogen equal to so much "ammonia"; the potash salts as containing so much anhydrous "potash."

1. PHOSPHATES.—The phosphates occurring in manures are known to chemists as ortho-phosphates, and they are of three kinds, which may be thus represented—

Lime } Lime } Lime }	Phosphoric acid.	Lime } Lime } Water }	Phosphoric acid.	Lime } Water } Water }	Phosphoric acid.
<i>Tricalcic phosphate.</i>		<i>Dicalcic phosphate.</i>		<i>Monocalcic phosphate.</i>	

Tricalcic phosphate is the natural phosphate occurring in bones and mineral phosphates. It is insoluble in water, and contains, when pure, about 46 per cent phosphoric acid.

Monocalcic phosphate is formed from tricalcic phosphate by dissolving it in acid, which takes away two-thirds of its lime, and replaces it with water. It is soluble in water, and contains, when pure, about 60 per cent phosphoric acid.

Dicalcic phosphate is intermediate between these two, and is formed by their union. This union occurs in the case of phosphates which have been treated with less acid than is required to dissolve them entirely—*e.g.*, in pure dissolved bones, and it is usually called *precipitated* or *reverted* phosphate. It contains, when pure, about 52 per cent phosphoric acid, is insoluble in water, but soluble in certain saline solutions, and is nearly as active manurially as monocalcic phosphate.

"Soluble phosphate" ought, strictly speaking, to mean monocalcic phosphate, but according to trade usage it does not. It means that amount of tricalcic phosphate which by means of acid has been converted into monocalcic phosphate, or in other words, the insoluble phosphate that has been rendered soluble. There is a certain advantage in expressing all kinds of phosphate in terms of their equivalent of tricalcic phosphate.

Phosphates of magnesia, of iron, and of alumina, when occurring in small proportion, are not usually estimated separately, but are reckoned as phosphate of lime.

2. NITROGEN occurs in manures mostly in three forms—Ammonia salts, nitrates, and albuminoid matter.

Ammonia sulphate (pure), contains 25½ per cent ammonia.

Ammonium chloride (pure), " 31½ "

Nitrate of soda (pure), contains nitrogen equal to 20 per cent ammonia.

Albuminoid matter contains from 14 to 16 per cent nitrogen, equal to from 17 to 19 per cent ammonia, most of which sooner or later becomes available as plant-food.

3. POTASH occurs mostly in the form of soluble salts, and should be reckoned as anhydrous potash (K_2O).

Sulphate of potash (pure), contains potassium = 54 per cent anhydrous potash.

Muriate of potash (pure), contains potassium = fully 63 per cent anhydrous potash.

FEEDING STUFFS—THEIR COMPOSITION AND CHARACTERISTICS.

These are concentrated forms of fodder, whose value depends upon their *albuminoid matter*, *oil*, and *carbohydrates* (such as starch and sugar).

LINSEED (seed of *Linum usitatissimum*, Common Flax).—Bombay seed large and pale; Baltic seed smaller and dark brown, more liable to

- impurities than Bombay seed ; should be crushed and plotted before feeding. Useful in calf foddery, also for milk-giving, and in the last stage of masting. Quantity, 1 to 3 lb. per 1000 lb. L.W.
- LINSEED-CAKE.**—Much approved feeding cake ; merits well known. Home-made cake usually softer and more oily than foreign. Very hard-pressed cake is low in oil, and not so easily eaten and digested. Linseed-cakes usually impure. Chief impurities, locust-beans added to give flavour and relish, rape-seed, less frequently chaff, and weed-seeds from badly screened seed. Should be broken to small pieces before feeding. Quantity, 2 to 6 lb. per 1000 lb. L.W.
- RAPE-CAKE** (seed of *Brassica napus* and *B. campestris*).—It has a greenish mottled appearance and a bitter taste, which renders it distasteful to cattle at first. Should be given in small quantity to begin with. Not suited for calves. When given to milch cows, the quantity should not exceed 2 or 3 lb. per head per day, or it will give a disagreeable taste to milk and butter. Sometimes very impure. A dangerous impurity is mustard-seed. May be detected by steeping in cold water for some hours, and noting smell of mustard. Danger may be avoided by steeping the ground cake in *boiling* water.
- POPPY-CAKE** (seed of *Papaver somniferum*).—Contains a savoury and easily digestible oil. May be fed to cattle in considerable quantity—5 to 8 lb. per head per day. More than 5 lb. per head per day to milch cows detracts from flavour of butter.
- HEMP-CAKE** (seed of *Cannabis sativa*).—Not much used for feeding. Not so digestible as the above, owing to abundance of woody fibre (25 per cent). Fed chiefly to horses and sheep. To milch cows not more than 1 lb. per head per day. Apt to grow mouldy in summer.
- SUNFLOWER-CAKE** (seed of *Helianthus annuus*).—Relished by stock, and well digested.
- COTTON-CAKE** (seed of *Gossypium hirsutum*, &c.) *Uncorticated*.—Best quality from Egyptian and Sea Island seed. Inferior qualities are woolly, and to be avoided. Husk has astringent properties, and is a good cure for *scour*. Should be ground to the size of linseed. Not very digestible, owing to abundance of woody fibre (28 per cent). Should be used freshly made, because liable to mould on keeping.
- Decorticated*—viz., cotton-cake deprived of the husk.—A very concentrated and powerful bye-fodder. Should be given with caution, crushed fine, and mixed with Indian corn, oats, or other farinaceous food. Large quantity is injurious, and may even be fatal. Very variable in composition. Frequently very hard pressed, and therefore indigestible. When freshly made, softly pressed, and of good quality, it is a valuable bye-fodder. Oil very bland and digestible ; used to adulterate olive-oil.
- SESAME-CAKE** (seed of *Sesamum orientale*).—Seed imported from India. Excellent bye-fodder, easily digested, much relished by all kinds of stock. Favourable for milk-giving, and also for masting. Oil bland and digestible, and much in favour for making margarine.
- RICE-MEAL** (seed of *Oryza sativa*).—The meal is a bye-product obtained in preparing rice for the market. A very good, safe, and acceptable fodder, but less concentrated than ordinary oilcakes. Varies very much in quality, and frequently adulterated with meal derived from rice husks. Much relished by stock, and useful for milch cows as well as for fattening animals.
- RYE-MEAL.**—Is the bran of rye, and rather more concentrated than wheat bran. It is very good fodder for cattle and sheep, but not for horses.
- PALM-KERNEL CAKE.**—An excellent, palatable, and easily digested bye-fodder. Especially good for milch cows. Increases the proportion of fat in milk. Puts a finish upon fattening stock. When ground to

powder and most of the oil extracted, it is sold as *Palm-kernel meal*, a much relished and digestible bye-fodder. A useful addition to calf-meals.

EARTH-NUT CAKE.—The pressed seed of a leguminous plant (*Arachis hypogæa*). The most concentrated of all cakes, containing from 45 to 50 per cent albumen and 6 to 9 per cent of oil. It is very palatable and digestible. A nutritious fodder when given in moderation. Apt to be contaminated with hair, and liable to rot on keeping if badly made.

FLESH-MEAL.—Residue obtained in the manufacture of *Liebig's Extract of Beef*. A highly nitrogenous bye-fodder, most suitable for enriching a too farinaceous dietary, such as potatoes. Much used in that way as a swine fodder. Easily digested, and readily accepted by cattle.

FISH-MEAL.—Bye-product of fish-curing yards, made chiefly from the heads of cod and tusk. Resembling fish guano in composition, but somewhat variable. Highly phosphatic, and therefore useful as a bye-fodder to young growing cattle. Ratio, from 1 to 3 lb. per head per day.

HERRING-MEAL.—A very oily fodder, useful as an adjunct to the dietary of milch cows. Quantity, 1 to 4 lb. per head per day.

LOCUST-BEANS—*Carob Bean*.—A sugary fodder, most palatable and acceptable to all kinds of stock. Used to mix with oilcakes and meals, so as to improve their flavour.

DRIED GRAINS.—The draff from distilleries and breweries dried so as to contain only about 10 per cent water. It is a first-class feeding stuff if of good quality, but the qualities differ considerably.

THE COMPOSITION OF FEEDING STUFFS.

The following is the average composition of genuine cakes and meals in common use:—

	Albuminoids.	Oil.	Carbohydrates.
Linseed-cake . . .	29	11	32
Rape-cake . . .	31	10	30
Poppy-cake . . .	35	10	22
Hemp-cake . . .	30	8½	17
Sunflower-cake . . .	33	9	27
Cotton-cake . . .	28	7½	30
„ (decorticated)	44	15	20
Sesame cake . . .	37	13	21
Rice-meal . . .	11	10	50
Paisley meal . . .	15	9	60
Rye-meal . . .	14.5	3½	60
Bran . . .	13.5	3½	56
Palm-kernel cake . . .	17	10	41
Palm-kernel meal . . .	19	3½	44
Earth-nut cake (shelled)	47	7½	25
Flesh-meal . . .	71	13	...
Fish-meal . . .	50	4	...
Herring-meal . . .	40	20	...
Locust-bean meal . . .	4	2	74
Linseed . . .	21	37	20
Dried grains . . .	20	8	50

USEFUL FACTORS.

Amount of	Multiplied by	Gives corresponding amount of
Nitrogen	1.214	Ammonia.
"	6.3	Albuminoid matter.
Ammonia . . . . .	.824	Nitrogen.
"	3.882	Sulphate of ammonia.
"	3.147	Muriate of ammonia.
"	3.706	Nitric acid.
"	5.0	Nitrate of soda.
Potash (anhydrous)	1.85	Sulphate of potash.
"	1.585	Muriate of potash.
Phosphoric acid (anhydrous)	2.183	¹ Phosphate of lime.
" "	1.4	Biphosphate.
" " "	1.648	² Soluble phosphate.
Soluble phosphate ²	1.325	¹ Phosphate of lime.
Biphosphate	1.566	"
Lime	1.845	"
"	1.786	Carbonate of lime.
Chlorine	1.648	Chloride of sodium.

The following are the forms in which analyses of *ordinary genuine manures* and feeding stuffs are usually reported:—

I. REPORTS OF ANALYSES OF *MANURES*.

(On the left side are the analytical details which may vary in form, and on the right the valuable constituents which must not vary in form, and which alone are considered in estimating the value of manures.)

1. Form of Analysis for SUPERPHOSPHATES, DISSOLVED BONES, and the like.

Phosphoric acid, soluble	Capable of yielding as valuable constituents.	
Do., in an insoluble state.....		
Lime	Phosphates of lime dissolved	}
Sulphuric acid, organic }	Do. do. undissolved	
matter, &c.		
Sand and insoluble matter.....	Ammonia . . . . .	.....

2. Form of Analysis for BONES, BONE-MEAL, FISH GUANO, and the like.

Phosphoric acid	Capable of yielding as valuable constituents.	
Lime		
Alkalies, &c.	Phosphate of lime . . . . .	.....
Organic matter	Ammonia . . . . .	.....
Moisture		
Sand and insoluble matter.....		

¹ Tricalcic ortho-phosphate (3CaO , P_2O_5).

² Monocalcic ortho-phosphate (CaO , $2\text{H}_2\text{O}$, P_2O_5).

3. Form of Analysis for MIXED MANURES, PERUVIAN and ICHABOE GUANOS, and the like.

Phosphoric acid, soluble	<i>Capable of yielding as valuable constituents.</i>	
Do., in an insoluble state	Phosphate of lime dissolved	}
Lime	Do. do. undissolved	
Alkalies, &c. }	Potash . . . . .	.....
Organic and volatile matter	Total nitrogen, = ammonia . . . . .	.....
Moisture		
Sand and insoluble matter.....		

II. REPORTS OF ANALYSES OF FEEDING STUFFS.

<i>Valuable Constituents</i>	{ Albuminoid compounds	= Nitrogen
	{ Oil . . . . .	.....
	{ Carbohydrates . . . . .	.....
	{ Woody fibre . . . . .	.....
	{ Moisture . . . . .	.....
	{ Ash . . . . .	.....

FORMS OF GUARANTEE.

GUARANTEE OF MANURE.

I guarantee that the manure called.....and sold by me to
.....contains a minimum of—

Soluble phosphoric acid = Phosphate of lime dissolvedper cent.
Insoluble phosphoric acid = Phosphate of lime undissolvedper cent.
Potash salts . . . = Potash (K_2O)per cent.
Total nitrogen . . . = Ammoniaper cent.

Signature of seller.....

Date.....18...

GUARANTEE OF FEEDING STUFF.

I guarantee that the feeding stuff called.....and sold by me to
.....contains a minimum of—

..... per cent albuminoids.
 per cent oil.
 per cent carbohydrates.

Signature of seller.....

Date18...

LOCAL ANALYTICAL ASSOCIATIONS WHO HAVE RECEIVED THE SOCIETY'S GRANTS.

	County.	Name of Association.	Name and Address of Secretary.	Number of Analyses.				Grants obtained.			
				1889.	1890.	1891.	1892.	1889.	1890.	1891.	1892.
1	Aberdeen	Alford Analytical Association	C. McConnach, Cairnballoch, Alford	19	18	15	14	£8 5 0	£7 15 0	£6 0 0	£6 5 0
2	"	Buchan Farmers' Analytical Association	Thomas Forrest, Mains of Lundquharn, Longside	10	11	7	7	4 10 0	4 10 0	2 10 0	2 15 0
3	"	Turriff Analytical Association	James Beattie, Gordonstown, Rothie-norman	32	16	26	..	15 0 0	6 15 0	10 15 0	..
4	Ayr	Galston and Loudoun Farmers' Analytical Association	Alex. Goldie, Irvine Bank House, Darvel	4	3	3	3	2 0 0	1 10 0	1 10 0	1 10 0
5	"	Grougar Farmers' Analytical Assoc.	B. Whyte, East Raws, Kilmarnock	3	4	4	5	1 0 0	1 10 0	1 5 0	1 15 0
6	Argyll	Kintyre Farmers' Analytical Assoc.	R. Dickie, Kileonan, Campbelltown	7	9	7	..	2 5 0	3 5 0	2 5 0	..
7	Gaithness	Cathness Farmers' Analytical Assoc.	G. Brown, Watten Mains, Cathness	..	..	..	..	..	..	..	..
8	Dumfries	Annandale Farmers' Club	J. & J. Baird and J. Mackenzie, Lockerbie	5	4	..	..	1 15 0	2 0 0	..	..
9	Elgin	Monkseyshire Analytical Assoc.	R. Barclay Gordon, 78 High St., Elgin	10	9	10	7	4 10 0	3 15 0	4 5 0	2 15 0
10	Forfar	Arbroath Analytical Association	James Kydd, Serryne, Carnoustie	25	31	43	21	9 0 0	14 0 0	20 5 0	9 5 0
11	"	Garso of Gowrie Farmers' Analytical Association	A. Anderson, Berryhill, Dundee	10	11	7	8	4 0 0	5 5 0	3 5 0	3 15 0
12	"	Kirriemuir Analytical Association	Andrew Osler, Kintyre, Kirriemuir	..	4	9	..	..	1 10 0	3 15 0	..
13	Inverness	Inverness Farmers' Society	William Ross, Seafield of Raigmore, Inverness	..	..	..	..	..	..	..	..
14	Kincardine	Kincardineshire Farmers' Club	A. B. Annandale, Stonehaven	..	..	..	..	..	..	..	..
15	Kirkcudbright	Kirkcudbright Analytical Association	R. Sproat, Leunox Phuntun, Kirkcudbright	21	17	14	..	9 15 0	7 15 0	6 0 0	3 0 0
16	Lanark.	Lanarkshire Analytical Association	J. Lindsay, Eastfield, Thackerston	15	19	16	14	6 0 0	6 15 0	6 5 0	4 10 0
17	"	Avonvale Farmers' Analytical Assoc.	John Paterson, Torfoot, Strathaven	..	4	7	8	1 5 0	2 10 0	2 15 0	..
18	Nairn	Nairnshire Analytical Association	J. S. Robertson, Cawdor Estate Office, Nairn	16	11	22	24	6 15 0	4 15 0	9 0 0	10 0 0
19	Orkney	Orkney Agricultural Society	Jas. Johnston, Orphir House, Orphir	..	..	..	..	..	..	..	..
20	Perth	Strathearn Analytical Association	J. T. Smith, Eastfield, Bridge of Earn	12	2	2	16	5 10 0	1 0 0	3 0 0	6 10 0
21	Perth	Perthshire Analytical Association	T. Anderson, Ballachroghan, Alness	23	6	11	..	8 15 0	2 15 0	4 10 0	..
22	"	Wester Ross Analytical Assoc.	Walter Arnes, Fodderty Lodge, Dingwall	32	14	30	33	12 10 0	5 0 0	11 15 0	12 0 0
23	Roxburgh	Kelso Analytical Association	Alex. Pott Stevenson, Kelso	12	5	14	5	4 15 0	2 0 0	5 15 0	2 0 0
24	Wigtown	Stoneykirk Analytical Association	James Hunter, Culgroat, Stranraer	4	10	13	10	1 10 0	4 5 0	5 0 0	4 0 0
				957	208	265	182	107 15 0	87 5 0	109 10 0	72 15 0

UNITS TO BE USED IN DETERMINING THE COMMERCIAL VALUE OF MANURES.¹

Terms—CASH, including Bags gross weight—not including Carriage.

N.B.—These units are based on the present RETAIL PRICES at port. When these units are multiplied by the percentages in the analysis of a Manure, they will produce a value representing very nearly the cash price at which one SINGLE TON may be bought in fine sowable condition. Larger purchases may be made on more favourable terms.

For Season 1893.

Items to be Valued.	Guanos.		Scrap Manures.		Bone-Meal.		Steamed Bone Flour.	Dissolved or Vitriolated Bones.	Superphosphates.	Dissolved Compounds.		
	Ichaboe.	Peruvian (Riddled).	Fish Guano.	Frey-Bentos Guano.								
Classes	Genuine.	Genuine.	a.	b.	a.	b.	a.			From	To	Average.
Phosphates—												
Dissolved	2/-	2/-	1/5	1/6	1/4	1/3	1/5	2/6	1/11	2/-	2/6	2/8
Undissolved	16/-	17/8	10/0	11/6	10/-	10/0	9/6	11/6	..	1/3	1/9	1/6
Ammonia	..	3/0	..	..	..	..	..	..	..	10/-	12/-	11/-
Potash	..	..	..	..	..	..	..	..	..	8/4	3/8	8/6
Prices per } From	250/-	230/-	130/-	150/-	120/-	105/-	100/-	95/-	95/-	45/-	..	..
ton, March } to	270/-	290/-	150/-	180/-	140/-	115/-	110/-	110/-	110/-	60/-	..	..
1893,												

CLASSIFICATION OF MANURES.

Fish guano . . .	{	Finely ground, and containing not more than 3 per cent oil.
Frey-Bentos guano . . .	{	(a) Meat-meal, free from horn, yielding over 13 per cent ammonia. (b) Mixed scrap, yielding 7 to 8 per cent ammonia, and 30 to 40 per cent phosphates.
Bone-meal . . .	{	(a) 90 per cent passing $\frac{1}{4}$ -inch sieve. (b) Coarser. Genuine bone-meal contains from 45 per cent to 55 per cent phosphates, and from 4 $\frac{1}{2}$ per cent to 5 $\frac{1}{2}$ per cent ammonia. The better qualities contain little or no fat.
Steamed bone-flour . . .	{	Ground to flour and containing about 60 per cent phosphates, and about 2 per cent ammonia.
Dissolved bones . . .	{	Must be pure—i.e., containing nothing but natural bones and sulphuric acid.
Dissolved compounds	{	Including "dissolved-bone manures" and all special manures consisting of ingredients mixed together and dissolved as a whole. The "Average" units should be used in valuing ordinary well-made dissolved compounds. If the manure is of superior manufacture and of high concentration, the units used should be above the average; if of inferior manufacture, or of low concentration, the units used should be below average. In valuing such manures for Associations, the units employed must be specified.
Mixtures . . .	{	To be valued according to the unit values (as given above) of the ingredients of which they are guaranteed and also found to be composed, with an addition of from 5 to 10 per cent according to the fineness of their manufacture.
Thomas-slag and ground phosphates	{	Fineness of grinding is of paramount importance. The coarsest kind used should be so finely ground that 80 per cent passes through a sieve of 10,000 holes per sq. inch.

Local Analytical Associations receiving grants from the Society must not use other units than these in valuing manures.

¹ See note, p. 41.

CASH PRICES (MARCH).

MANURES.			
	Guarantee.	Price per Ton.	Unit.
	Per cent. 24 Am.	£ s. d. 11 10 0	Am. = 9/7
Sulphate of ammonia, 97 per cent	19 "	10 5 0	" = 10/0
Nitrate of soda, 95 per cent	5.5 "	3 10 0	" = 12/9
Castor-cake dust	15 "	8 10 0	" = 11/4
Horn-dust	15 "	8 0 0	" = 10/7
Dried blood	50 Pot.	8 15 0	Pot. = 8/6
Muriate of potash, 80 per cent	27 "	5 5 0	" = 3/10
Sulphate of potash, 50 per cent	12 "	2 0 0	" = 3/4
Kalnit, 28 per cent	{ 14 Am. 40 Pot. }	14 10 0 {	{ Am. = 10/ Pot. = 3/9 }
Nitrate of potash, 73 per cent	57 Phos.	3 0 0	Phos. = 1/
Ground Charleston phos.	50 "	2 5 0	" = 0/11
Belgian phosphate	30 "	1 16 0	" = 1/2
Thomas-slag (fine) Scotch	37 "	2 3 0	" = 1/2
" " " English	{ 67 " 1 Am. }	5 0 0 {	{ " = 1/1 Am. = 10/ }
Phosphatic Guano			

FEEDING STUFFS.				Price per Ton in bags.
	Analyses.			
	Album.	Oil.	Carbo- hydrates.	
Linseed-cake	28	10	85	£ s. d. 8 15 0
Decorticated cotton-cake	45	8	20	7 5 0
Undecorticated do.	24	7	25	5 5 0
Liebig's meat-meal	70	12	..	10 0 0
Rapo-cake	82	10	27	5 15 0
Bean-meal	25	2	50	7 15 0
Locust-bean meal	6	2	70	6 0 0
Dried grains	20	8	50	5 0 0
Indian corn	10	5	55	5 15 0
Paisley meal	15	9	60	4 15 0
Linseed (whole)	20	35	14	18 7 6
Linseed-oil . . . . .	..	..	..	20 0
Molasses . . . . .	..	..	..	5 10 0

INSTRUCTIONS FOR VALUING MANURES.

The commercial values of manures are determined by means of the Units in the following manner :—

Take the analysis of the manure, and look for the following substances :—

Phosphates dissolved (or soluble phosphate)	} No other items but these are to be valued.
„ undissolved (or insoluble „	
Ammonia	
Potash	

Should the analysis or the guarantee not be expressed in that way, the chemist or the seller should be asked to state the quantities in these terms.

Suppose the manure is bone-meal :—

There are two classes of bones, according to their fineness. An ordinary bone-meal will fall under Class (a), and it will contain about 50 per cent phosphate, and 5 per cent ammonia. The units for bones, Class (a), are 1s. 4d. for insoluble phosphate, and 10s. for ammonia. Therefore the value is—

Insol. phosphate, 50 times 1s. 4d., equal to	£3	6	8
Ammonia, 5 „ 10s. „	2	10	0

Say £5 16 8 per ton.

Suppose the manure is dissolved or vitriolated bones :—

It must be guaranteed “pure.”

The units in the Schedule are 2s. 9d. for soluble phosphate, 1s. 6d. for insoluble phosphate, and 12s. for ammonia.

The analysis will be about 15 per cent soluble phosphate, 20 per cent insoluble phosphate, and 3 per cent ammonia. In that case the value would be—

Sol. phosphate, 15 times 2s. 6d., equal to	£1	17	6
Insol. „ 20 „ 1s. 6d. „	1	10	0
Ammonia, 3 „ 11s. 6d. „	1	14	6

Say £5 2 0 per ton.

Suppose the manure is a superphosphate,—say an ordinary superphosphate, with 27 per cent soluble phosphate and 3 per cent insoluble phosphate. It is valued thus—

Sol. phosphate, 27 times 1s. 11d., equal to, say, £2 11 9 per ton.
Insoluble phosphate is not valued in a superphosphate.

Suppose the manure is a dissolved compound, such as *dissolved-bone manures*, or a special manure, such as a *turnip or potato manure*, it will be valued according to the units under “Dissolved Compounds,” the *average* units for which are 2s. 3d. for soluble phosphate, 1s. 6d. for insoluble phosphate, 11s. for ammonia, and 4s. for potash, in the Schedule. Thus, an ordinary turnip manure containing 20 per cent soluble phosphate, 10 per cent insoluble phosphate, 3 per cent ammonia, and 2 per cent potash, would be valued thus—

Sol. phosphate, 20 times 2s. 3d., equal to	£2	5	0
Insol. do., 10 „ 1s. 6d., „	0	15	0
Ammonia, 3 „ 11s. „	1	13	0
Potash, 2 „ 3s. 6d. „	0	7	0

Say £5 0 0 per ton

Note.—The units have reference solely to the COMMERCIAL VALUES of Manures, and not to their AGRICULTURAL VALUES.

Thus, in stating soluble phosphate in dissolved bones at 2s. 6d. per unit, and that in superphosphate at 1s. 11d., it is meant that these are the prices per unit at which soluble phosphate can be bought in these two manures; but it does not mean that the soluble phosphate in the one is 7d. per unit better as a manure than that in the other. It is probably no better.

BOTANICAL DEPARTMENT.

Consulting Botanist to the Society—A. N. M'ALPINE, Minto House, Chambers Street, Edinburgh.

The Society have fixed the following rates of charge for the examination of plants and seeds for the *bona fide* and individual use and information of members of the Society (not being seedsmen), who are particularly requested, when applying to the Consulting Botanist, to mention the kind of examination they require, and to quote its number in the subjoined schedule. The charge for examination must be paid at the time of application, and the carriage of all parcels must be prepaid.

Scale of Charges.

1. A report on the purity, amount, and nature of foreign materials, 2s.
2. On the germinating power of a sample of seed, 2s.
3. Determination of the species of any weed or other plant, or of any vegetable parasite, with a report on its habits and the means for its extermination or prevention, 5s.
4. Report on any disease affecting farm crops, 5s.
5. Determination of the species of any natural grass or fodder plant, with a report on its habits and pasture or feeding value, 1s.

The Consulting Botanist's Reports are furnished to enable members—purchasers of seeds and corn for agricultural purposes—to test the value of what they buy, and are not to be used or made available for advertising or trade purposes by seedsmen or otherwise.

Instructions for Selecting and Sending Samples.

In sending seed or corn for examination, the utmost care must be taken to secure a fair and honest sample. In the case of grass seeds, the sample would be drawn from the centre of the sack or bag, and in all cases from the bulk delivered to the purchaser. If anything supposed to be injurious or useless exists in the corn or seed selected, samples should also be sent.

When possible, at least one ounce of grass and other small seeds should be sent, and two ounces of cereals or larger seeds. The exact name under which the seed has been bought (but preferably, a copy of the invoice) should accompany the sample.

Grass seeds should be sent at least four weeks, and clover seeds two weeks, before they are to be used.

In collecting specimens of plants, the whole plant should be taken up and the earth shaken from the roots. If possible, the plants must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. Place them in a bottle, or pack them in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

It is strongly recommended that members purchasing seeds should insist—

(1) Upon having from the seller a guarantee stating the purity and germination of the seed supplied.

(2) That the bulk be same as sample.

(3) That it contain not more than 5 per cent other than the species ordered.

If the purity and germination of the seed is not known, it is impossible to tell either its money value or the proper amount to be sown.

It is also strongly recommended that the purchase of prepared mixtures should be avoided, and the different seeds to be used should be purchased separately.

Parcels or letters containing seeds or plants for examination (carriage or postage paid) must be addressed to Professor M'Alpine, Botanical Laboratory, Minto House, Chambers Street, Edinburgh.

Grant for grass experiments in 1890, £30.

DAIRY DEPARTMENT.

The Society established in 1885 a Dairy Department, to promote the dairy interests.

During 1885, 1886, 1887, 1888, 1889, 1890, 1891, and 1892, the Society placed at the disposal of the Committee a sum of £100 to aid local efforts in the employment of itinerating Instructors and Demonstrators in Cheese and Butter making.

The grants have been appropriated among the different branches of the Scottish Dairy Associations as follows :—

Branch.	1889.	1890.	1891.	1892.
Ayrshire . . . . .	...	...	...	...
Wigtownshire, Rhinns District } . . . . .	...	...	...	...
Wigtownshire, Lower District } . . . . .	...	...	...	...
Kirkcudbright . . . . .	...	...	...	...
Dumfriesshire . . . . .	...	...	...	...
Royal Northern Society . . . . .	...	...	£20 0 0	£20 0 0
Angus and Mearns Dairy School . . . . .	...	...	20 0 0	20 0 0
Kilmarnock Dairy School	£100 0 0	£100 0 0	60 0 0	60 0 0
	£100 0 0	£100 0 0	£100 0 0	£100 0 0

PREMIUMS.

GENERAL REGULATIONS FOR COMPETITORS.

1. It is to be distinctly understood that the Society is not responsible for the views, statements, or opinions of any of the writers whose papers are published in the 'Transactions.'

2. All reports must be legibly written, and on one side of the paper only; they must specify the number and subject of the Premium for which they are in competition; they must bear a distinguishing motto, and be accompanied by a sealed letter, similarly marked, containing the name and address of the reporter—initials must not be used.

3. No sealed letter, unless belonging to a report found entitled to at least one-half of the Premium offered, will be opened without the author's consent.

4. Reports for which a Premium, or one-half of it, has been awarded, become the property of the Society, and cannot be published in whole or in part, nor circulated in any manner, without the consent of the Directors. All other papers will be returned to the authors if applied for within twelve months.

5. When a report is unsatisfactory, the Society is not bound to award the whole or any part of a Premium.

6. All reports must be of a practical character, containing the results of the writer's own observation or experiment, and the special conditions attached to each Premium must be strictly fulfilled. General essays, and papers compiled from books, will not be rewarded. Weights and measurements must be indicated by the imperial standards.

7. The Directors, before awarding a Premium, shall have power to require the writer of any report to verify the statements made in it.

8. The decisions of the Board of Directors are final and conclusive as to all Premiums, whether for Reports or at General or District Shows; and it shall not be competent to raise any question or appeal touching such decisions before any other tribunal.

9. The Directors will welcome papers from any Contributor on any suitable subject not included in the Premium List; and if the topic and the treatment of it are both approved, the writer will be remunerated, and his paper published.

CLASS I.

R E P O R T S.

SECTION 1.—THE SCIENCE AND PRACTICE OF AGRICULTURE.

FOR APPROVED REPORTS.

1. On the results of experiments for fixing and retaining the volatile and soluble ingredients in Farmyard Manure—Twenty Sovereigns. To be lodged by 1st November in any year.

The Report must detail the treatment adopted to fix and retain these ingredients—the materials used for that purpose, and the quantity and cost thereof—comparative analyses of the manure with and without the treatment, and also a statement of the crops grown with manure and without such treatment, must be given by the Reporter. The experiments to have extended over at least two years and crops.

2. On the results of experiments for ascertaining the comparative value of Farmyard Manure obtained from cattle fed upon different varieties of food, by the application of such manure to farm crops—Twenty Sovereigns. To be lodged by 1st November in any year.

The Report must state the effects produced on two successive crops by the application of manure obtained from cattle fed on different sorts of food, such as turnips and straw alone; and turnips and straw, with an addition of oilcake, linseed, bean-meal, grain, or other substances. The animals should be as nearly as possible of the same age, weight, condition, and maturity, and each lot should receive daily the same quantity of litter; and, except as to the difference of food, they must be treated alike.

The preparation of the manure, by fermentation or otherwise, should be in every respect the same; and it is desirable that not less than two several experiments be made with each kind, and that the ground to which it is to be applied be as equal as possible in quality and condition.

3. On the hardy and useful Herbaceous Plants of any country, where such climate exists as to induce the belief that the plants may be beneficially introduced into the cultivation of Scotland

—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

Attention is particularly directed to the grains and grasses of China, Japan, the Islands of the Eastern Archipelago, the Himalaya country, the Falkland and South Sea Islands, California, and the high north-western district of America.

Reporters are required to give the generic and specific names of the plants treated of, with the authority for the same—together with the native names, so far as known; and to state the elevation of the locality and nature of the soil in which they are cultivated, or which they naturally inhabit, with their qualities or uses; and it is further requested that the descriptions be accompanied, in so far as possible, with specimens of the plants, and their fruit, seed, and other products.

4. On the comparative advantages of Feeding Home-bred or Canadian Cattle—Ten Sovereigns. To be lodged by 1st November 1893.

The writer's own practical experience to be stated, and five of each class to be reported on.

5. On the comparative advantages of Fattening Cattle in stalls, courts, or covered yards—Twenty Sovereigns. To be lodged by 1st November in any year.

The Report must detail the comparative result of actual experiments. The same quantities and kinds of food must be used. Information is required as to the comparative expense of attendance, the cost of erecting the buildings, and any other circumstances deserving of attention. The state of the weather during the experiment, in point of temperature and wetness, and the advantages or disadvantages of clipping cattle put up to feed, must be particularly noted and reported.

6. On experiments for ascertaining the actual addition of weight to growing or fattening Stock, by the use of different kinds of food—Twenty Sovereigns. To be lodged by 1st November in any year.

The attention of the experimenter is directed to turnips, carrots, beet, mangel-wurzel, potatoes, cabbage, as well as to beans, oats, barley, Indian corn, linseed, oilcake or rapeseed, and to the effect of warmth and proper ventilation, and the difference between food cooked and raw. The above roots and other kinds of food are merely suggested; competitors are neither restricted to them nor obliged to experiment on all of them.

When experiments are made with linseed and cake, attention should be paid to the comparative advantages, economically and otherwise, of the substance in these two states.

Before commencing the comparative experiments, the animals must be fed alike for some time previously.

The progress of different breeds may be compared. This will form an interesting experiment of itself, for Reports of which encouragement will be given.

N.B.—The experiments specified in the two previous subjects must be conducted over a period of not less than three months. No lot shall consist of fewer than four Cattle or ten Sheep. The animals selected should be of the same age, sex, and breed, and as nearly as possible of the same weight, condition, and maturity. The live weight before and after the experiment must be stated, and if killed, their dead weight and quantity of tallow.

7. 'On Dairy Management, giving the most approved systems of Butter and Cheese Making, the use of the Thermometer, and the best Dairy Utensils—Ten Sovereigns. To be lodged by 1st November 1893.

The Report must be thoroughly practical, and embrace the writer's own experience of butter and cheese making.

8. On the comparative Feeding Value of Ensilage, alone or with other ordinary Farm produce—Fifteen Sovereigns. To be lodged by 1st February 1894.

The Report must detail the comparative result of actual experiments; and the same quantities and kinds of food must be used.

9. On any useful practice in Rural Economy adopted in other countries, and susceptible of being introduced with advantage into Scotland—The Gold Medal. To be lodged by 1st November in any year.

The purposes chiefly contemplated by the offer of this premium is to induce travellers to notice and record such particular practices as may seem calculated to benefit Scotland. The Report to be founded on personal observation.

SECTION 2.—ESTATE IMPROVEMENTS.

FOR APPROVED REPORTS.

1. By the Proprietor in Scotland who shall have executed the most judicious, successful, and extensive Improvement—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

Should the successful Report be written for the Proprietor by his resident factor or farm manager, a Minor Gold Medal will be awarded to the writer in addition to the Gold Medal to the Proprietor.

The merits of the Report will not be determined so much by the mere extent of the improvements, as by their character and relation to the size of the property. The improvements may comprise reclaiming, draining, enclosing, planting, road-making, building, and all other operations proper to lauded estates. The period within which the operations may have been conducted is not limited, except that it must not exceed the term of the Reporter's proprietorship.

2. By the Proprietor in Scotland who shall have erected on his estate the most approved Farm-buildings—The Gold Medal. Reports, Plans, and Specifications to be lodged by 1st November in any year.

3. By the Proprietor or Tenant in Scotland who shall have reclaimed within the ten preceding years not less than forty acres of Waste Land—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

4. By the Tenant in Scotland who shall have reclaimed within the ten preceding years not less than twenty acres of Waste Land—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

5. By the Tenant in Scotland who shall have reclaimed not less than ten acres within a similar period—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November in any year.

The Reports in competition for Nos. 3, 4, and 5 may comprehend such general observations on the improvement of waste lands as the writer's experience may lead him to make, but must refer especially to the lands reclaimed—to the nature of the soil—the previous state and probable value of the subject—the obstacles opposed to its improvement—the details of the various operations—the mode of cultivation adopted—and the produce and value of the crops produced. As the required extent cannot be made up of different patches of land, the improvement must have relation to one subject; it must be of profitable character, and a rotation of crops must have been concluded before the date of the Report. *A detailed statement of the expenditure and return and a certified measurement of the ground are requisite.*

6. By the Proprietor or Tenant in Scotland who shall have improved within the ten preceding years the Pasturage of not less than thirty acres, by means of top-dressing, draining, or otherwise, without tillage, in situations where tillage may be inexpedient—The Gold Medal, or Ten Sovereigns. To be lodged by 1st November in any year.

7. By the Tenant in Scotland who shall have improved not less than ten acres within a similar period—The Minor Gold Medal. To be lodged by 1st November in any year.

Reports in competition for Nos. 6 and 7 must state the particular mode of management adopted, the substances applied, the elevation and nature of the soil, its previous natural products, and the changes produced.

SECTION 3.—HIGHLAND INDUSTRIES AND FISHERIES.

FOR APPROVED REPORTS.

1. The best mode of treating native Wool; cleaning, carding, dyeing, spinning, knitting, and weaving by hand in the Highlands and Islands of Scotland—Five Sovereigns. To be lodged by 1st November 1893.

2. The best means of utilising the Sprat Fisheries—Five Sovereigns. To be lodged by 1st November 1893.

SECTION 4.—MACHINERY.

FOR APPROVED REPORTS.

SECTION 5.—FORESTRY DEPARTMENT.

FOR APPROVED REPORTS.

1. On Plantations of not less than eight years' standing formed on deep peat-bog—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November 1893.

The premium is strictly applicable to deep peat or flow moss; the condition of the moss previous to planting, as well as at the date of the Report, should, if possible, be stated.

The Report must describe the mode and extent of the drainage, and the effect it has had in subsiding the moss—the trenching, levelling, or other preliminary operations that may have been performed on the surface—the mode of planting—kinds, sizes, and number of trees planted per acre—and their relative progress and value, as compared with plantations of a similar age and description grown on other soils in the vicinity.

2. On the more extended introduction of hardy, useful, or ornamental Trees, which have not hitherto been generally cultivated in Scotland—The Medium Gold Medal, or Five Sovereigns. To be lodged by 1st November in any year.

The Report should specify as distinctly as possible the kind of trees introduced. The adaptation of the trees for use or ornament, and their comparative progress, should be mentioned. Attention is directed to the introduction of any tree as a nurse in young plantations, which by growing rapidly for several years, and attaining maturity when at the height of 20 or 25 feet, might realise the advantage and avoid the evils of thick planting.

3. On the Life-History of any Insect or Tribe of Insects which is injurious to British Forest Trees (*e.g.*, *Scolytus destructor*, of the Elm)—Fifteen Sovereigns. To be lodged by 1st November 1893.

The means for guarding against or destroying these pests to be mentioned, and the Report to be illustrated by original drawings and specimens of the insect and its ravages.

The *Pine Beetle*, the *Fir Weevil*, the *Black Arch Nun* (or *Spruce Moth*), and the *Elm-bark Beetle* are excluded, having been already reported on.

CLASS II.

DISTRICT COMPETITIONS.

REGULATIONS 1893.

The Money Premiums and Medals awarded at District Competitions will be sent direct to the winners in January next. No payments must therefore be made by the Secretary or Treasurer of any local Association.

Grants in aid of DISTRICT COMPETITIONS for 1894 must be applied for before 1st November 1893, on Forms to be obtained from the Secretary.

When a Grant has expired, the District cannot apply again for aid for two years.

SECTION I.—GRANTS TO DISTRICT SOCIETIES FOR HORSES, CATTLE, SHEEP, AND PIGS.

1. CLASS OF STOCK—LIMIT OF GRANTS, £340.—The Highland and Agricultural Society will make Grants to District Societies to deal with, as in the opinion of the District Societies the need of each district may require, for such classes of breeding Stock of Horses, Cattle, Sheep, and Pigs as are embraced in the General Show Prize List of the Highland and Agricultural Society. The total sum to be expended by the Highland and Agricultural Society in such Grants shall not exceed the sum of £340 in any one year.

2. GRANT TO DISTRICT, £12.—The portion of the Grant to any one District Society shall not exceed the sum of £12 in any one year.

3. CONTINUANCE OF GRANT THREE YEARS—ADVERTISING.—The Grant shall continue for three alternate years, provided always that the District Society shall, in the two intermediate years, continue the competition by offering Premiums equal in amount to not less than one-half the sum given by the Highland and Agricultural Society, and for the same class of Stock as that selected in each previous year to compete for the Highland and Agricultural Society's Prizes. The Prizes when given by the Highland and Agricultural Society must be announced as their gift. If no competition takes place for two years the Grant expires.

4. When it is agreed to hold the General Show of the Society in any district, no provincial show shall be held in that district in the months of June, July, or August.

5. MEDALS.—In the two alternate years the Highland and Agricultural Society will place three Minor Silver Medals at the disposal of the District Societies, for the same classes of Stock as those for which the Money Premiums are offered, provided that not less than three lots are exhibited in the same class.

6. RULES OF COMPETITION.—The Rules of Competition for the Premiums, the Funds for which are derived from Grants of the Highland and Agricultural Society, shall be such as are generally enforced by the Society receiving the Grant for Premiums offered by itself.

7. AREA AND PARISHES—FIVE PARISHES.—When making application for Grants from the Highland and Agricultural Society, the District Society must delineate the area and the number of parishes comprised in the district, and *except in special cases*, no District Society shall be entitled to a Grant whose show is not open to at least *five* Parishes.

8. NOMINATION OF MEMBERS.—At the time of making a Grant to a District Society, the Directors shall nominate one or more members of

the Highland and Agricultural Society resident in the district, whose duty it shall be to see that the conditions imposed by the Board are complied with.

9. **REPORTS.**—Blank Reports will be furnished to the Secretaries of the different District Societies. These Reports must in all details be completed and lodged with the Secretary of the Highland and Agricultural Society on or before the 1st of November next following the competition, both in the years when the Grant is given and in the two intermediate years, for the approval of the Directors of the Highland and Agricultural Society, against whose decision there shall be no appeal. All such Reports must be signed and certified by the Members of the Highland and Agricultural Society nominated under Rule 7.

10. **GRANTS—WHEN PAID.**—The Grants made to District Societies will be paid in the January following the competition, by Precepts issued by the Directors of the Highland and Agricultural Society to the winners of the prizes. No payments of these Grants must be made by the Secretary or Treasurer of any District Society. Medals will be issued at the same time.

11. **RENEWAL OF APPLICATION.**—No application for renewal of a Grant to a District Society will be entertained until the expiration of *two years* from the termination of the last Grant.

12. **DISPOSAL OF APPLICATIONS.**—In disposing of applications for District Grants, the Directors of the Highland and Agricultural Society shall keep in view the length of interval that has elapsed since the expiration of the last Grant, giving priority to those District Societies which have been longest off the list.

13. **DAIRY PRODUCE.**—Upon application being made by District Societies, a limited number of Medals will be placed at the Disposal of District Societies for Dairy Produce.

DISTRICTS.

1. **WESTER ROSS.**—*Convener*, Major Randle Jackson of Swordale, Evanston; *Secretary*, David Ross, Dingwall. Granted 1888. (In abeyance in 1892.)
2. **LAMMERMOOR PASTORAL.**—*Convener*, Richard Stephenson, Chapel, Duns; *Secretary*, A. M. Caverhill, Crichness, Duns. Granted 1888. (In abeyance in 1890.)
3. **SPEY, AVEN, AND FIDDOCHSIDE.**—*Convener*, Sir George Macpherson Grant of Ballindalloch, Bart.; *Secretary*, A. R. Stuart of Inverfiddich, Craigellachie. Granted 1891.
4. **JED-FORREST.**—*Convener*, Gideon Pott, Knowesmouth, Jedburgh; *Secretary*, Richard Davidson, Swinnie, Jedburgh. Granted 1891.
5. **CENTRAL BANFFSHIRE.**—*Convener*, John M'Pherson, Mulben, Keith; *Secretary*, George Donald, Ladyhill, Frange, Keith. Granted 1893.
6. **STRATHSPEY.**—*Convener*, John Smith, Inverallan House, Grantown; *Secretary*, D. G. Lawson, Board Office, Grantown. Granted 1893.
7. **WEST LINTON.**—*Convener*, George Forrest, Edston, Peebles; *Secretary*, F. W. Dyson, Crossburn, Peebles. Granted 1893.
8. **ISLAY, JURA, AND COLONSAY.**—*Convener*, J. S. R. Ballingall, Ballabus House, Islay; *Secretary*, Robert Cullen, Bridgend, Islay. Granted 1893.
9. **WEST TEVIOTDALE.**—*Convener and Secretary*, James Oliver, Hawick. Granted 1893.
10. **KINCARDINESHIRE.**—*Convener*, John Hart, Cowie Mains, Stonehaven; *Secretary*, A. B. Annandale, Stonehaven. Granted 1892.

In 1893.

Nos. 1 and 2 are in competition for the last year.

Nos. 3 and 4 are in competition for the second year.

Nos. 5, 6, 7, 8, and 9 are in competition for the first year.

No. 10 competes for local Premiums.

SECTION 2.—GRANTS TO HORSE ASSOCIATIONS, &c., FOR STALLIONS FOR AGRICULTURAL PURPOSES.

1. **HORSES—LIMIT OF GRANT, £210.**—The Highland and Agricultural Society will make Grants to Horse Associations and other Societies in different districts engaging Stallions for agricultural purposes. The total sum expended by the Highland and Agricultural Society in such Grants shall not exceed the sum of £210 in any one year.

2. **GRANT TO EACH, £15.**—The portion of the Grant to any one Horse Association, &c., shall not exceed the sum of £15 in any one year.

3. **CONTINUANCE OF GRANT THREE YEARS—INTERMEDIATE YEAR.**—The Grant shall continue for three alternate years, provided always that the Horse Association or Society shall, in the two intermediate years, offer at least a sum equal in amount to that granted by the Highland and Agricultural Society for the hire of a Horse in connection with the Association or Society to whom the Grant is made.

4. **NOMINATION OF MEMBERS.**—At the time of making the Grant to a Horse Association or Society, the Directors of the Highland and Agricultural Society shall nominate one or more members of the Highland and Agricultural Society, resident in the Districts in which the Society benefited is located, whose duty it shall be to see that the conditions imposed by the Board are complied with.

5. **REPORTS—PENALTY FOR NOT ENGAGING HORSE.**—No grant by the Highland and Agricultural Society to Horse Associations, &c., will be paid unless a report, signed and certified by the members appointed under Rule 4, be furnished to the Highland and Agricultural Society not later than the 1st of November in each year in which the Grant is made, and also in the alternate years, stating that a Horse has been engaged by the Horse Association or other Society to whom the Grant is made; and in the event of a Horse not being engaged in any one year while the provisions of the Grant are in force, the Grant made by the Highland and Agricultural Society will cease.

6. **RULES 9 (Time of Payment), 10 (Renewal of Grant), and 11 (Disposal of Applications)** applicable to Section 1, shall be applicable to Section 2.

DISTRICTS.

1. **ELGIN AND NORTHERN DISTRICT CLYDESDALE HORSE SOCIETY.**—*Convener*, H. M. S. Mackay, Elgin; *Secretary*, James Sutor, Solicitor, Elgin. Granted 1889.
2. **LANARK CLYDESDALE HORSE SOCIETY, AND UPPER WARD OF LANARKSHIRE.**—*Convener*, James Weir, Sandilands, Lanark; *Secretary*, Wm. Elliot, Markgreen, Lanark. Granted 1889.
3. **NAIRNSHIRE.**—*Convener*, R. Anderson of Lochdhu, Nairn; *Secretary*, John Joss, Budgate, Cawdor, Nairn. Granted 1891.
4. **INVERNESS FARMERS' SOCIETY.**—*Convener*, Duncan Forbes of Culloden, Inverness; *Secretary*, G. J. Campbell, 12 Lombard Street, Inverness. Granted 1893.

5. SPEYSIDE CLYDESDALE HORSE-BREEDING ASSOCIATION.—*Convener*, Col. John Gordon Smith of Delnabo, Glenlivet, Ballindalloch; *Secretary*, A. R. Stuart of Inverfiddich, Craigellachie. (Granted 1893)
6. LOWER WARD OF RENFREWSHIRE STALLION SOCIETY.—*Convener*, R. Sinclair Scott, Burnside, Largs; *Secretary*, R. Stewart Walker, 28 Nicholson Street, Greenock. Granted 1893.

In 1893.

Nos. 1 and 2 are in competition for the last year.

No. 3 is in competition for the second year.

Nos. 4, 5, and 6 are in competition for the first year.

DAIRY PRODUCE.

Upon application being made by District Societies, a limited number of Medals will be placed at the disposal of District Societies for Dairy Produce.

SPECIAL GRANTS.

- £20 to the Ayrshire Agricultural Association, to be competed for at the Dairy Produce Show at Kilmarnock.—*Convener*, The Hon. G. R. Vernon, Auchans House, Kilmarnock; *Secretary*, James M'Murtrie, Ayr. Granted 1872.
- £5 to Shetland Agricultural Society.—*Convener*, John Bruce of Sumburgh, Lerwick; *Joint-Secretaries*, Archibald J. Garrioch and D. M'Arthur, Lerwick. Granted 1893.
- £3 to Orkney.—*Secretary*, James Johnston, Orphir House, Orkney. Granted 1883
- £3 to Orkney Horse-Breeding Society.—*Convener*, James Drever, Swanny House, Finstown; *Secretary*, Robert Searth, Binscaith, Finstown. Granted 1892.
- £3 to Rousay.—*Convener*, General Burroughs of Rousay, G.B.; *Secretary*, R. Mainland, Banks, Frotoft, Rousay. Granted 1883.
- £3 to South Uist and Barra.—*Convener and Secretary*, Donald Paterson, Askernish, South Uist, Oban. Granted 1890.
- £3 to North Uist.—*Convener*, Sir John Campbell Oude, Bart.; *Secretary*, James M. Fraser, Banker, Lochmaddy. Granted 1890.

MEDALS IN AID OF PREMIUMS GIVEN BY LOCAL SOCIETIES.

The Society, being anxious to co-operate with local Associations, will give a limited number of Minor Silver Medals annually to Societies, not on the list of Cattle, Horse, or Sheep Premiums, in addition to the Money Premiums awarded in the Districts for—

1. Best Bull, Cow, Heifer of any pure breed, or Ox.
2. Best Stallion, Mare, or Gelding.
3. Best Tup, or Pen of Ewes or Wethers.
4. Best Boar, Sow, or Pig.
5. Best Coops of Poultry.
6. Best Sample of any variety of Wool.
7. Best Sample of any variety of Seeds.
8. Best managed Farm.
9. Best managed Green Crop.

10. Best managed Hay Crop.
11. Best managed Dairy.
12. Best Sweet-Milk Cheese.
13. Best Cured Butter.
14. Best sample of Honey, not less than 5 lb., taken without destroying the bees.
15. Best collection of Roots.
16. Best kept Fences.
17. Male Farm Servant who has been longest in the same service, and who has proved himself most efficient in his duties, and to have invariably treated the animals under his charge with kindness.
18. Female Servant in charge of Dairy and Poultry who has been longest in the same service, and who has proved herself most efficient in her duties, and to have invariably treated the animals under her charge with kindness.
19. Best Sheep-Shearer.
20. Most expert Hedge-Cutter.
21. Most expert Labourer at Draining.
22. Most expert Farm Servant at trial of Reaping-Machines.
23. Best Maker of Oat-Cakes.

It is left to the local Society to choose out of the foregoing list the classes for which the Medals are to be competed.

The Medals are granted for two years.

In 1889 it was resolved that in future no Society shall receive more than two Medals for two years.

Aberdeenshire.

1. ABERDOUR.—*Convener*, Alex. Lovie, Nether Boyndlie, Fraserburgh; *Secretary*, Wm. Chapman, Woodhead, Aberdeen, Fraserburgh. 2 Medals. 1893.
2. EBRISIDE.—*Convener*, John Grant, Banker, Methlick; *Secretary*, Alex. Fowler, Auchnagatt. 2 Medals. 1893.
3. INVERURIE.—*Convener and Secretary*, James Stephen, Conglass, Inverurie. 2 Medals. 1892.
4. KENNETHMONT.—*Convener*, Wm. A. Mitchell, Auchnagathel, Keig, Whitehouse; *Secretary*, James R. Moir, 4 Belmont Road, Aberdeen. 2 Medals. 1893.
5. NORTH OF SCOTLAND BEE SOCIETY.—*Convener*, D. C. Darling, 11 Bridge Street, Aberdeen; *Secretary*, A. M. Byres, C.A., 18 Union Terrace, Aberdeen. 2 Medals. 1893.

Argyllshire.

6. ARDNAMURCHAN, MOIDART, AND SUNART.—*Convener and Joint-Secretary*, R. Evarard Jones, Glenmoidart, Salen; *Joint-Secretary*, R. D. Coltart, Achaleeny, Ardgour. 2 Medals. 1893.
7. NETHER LORN.—*Convener*, John Gillies, Barnacarrig, Kiluiver, Oban; *Secretary*, Peter Fisher, Kilbrandon, Oban. 2 Medals. 1892.

Ayrshire.

8. ARDROSSAN.—*Convener*, Andrew Allan, Munnoch, Dalry; *Secretary*, Andrew Stirrat, Saltcoats. 2 Medals. 1893.

9. BEITH.—*Convener*, Peter Skeoch, Boydstone, Beith; *Secretary*, Matthew Gilmour, Clydesdale Bank, Beith. 2 Medals. 1893.
10. DUNDONALD.—*Convener and Secretary*, John Caldwell, Bogside, Dundonald, Dreghorn. 2 Medals. 1892.
11. FENWICK.—*Convener*, Gavin Allan, 54 Old Dumbarton Road, Glasgow; *Secretary*, Robert Young, East Tannicrief, Fenwick. 2 Medals. 1892.
12. IRVINE.—*Convener*, William Sloan, Brieryside, Monkton; *Secretary*, A. C. M'Jannet, Writer, Irvine. 2 Medals. 1886. (In abeyance in 1890, 1891, and 1892.)
13. KILBIRNIE.—*Convener*, John Kerr, Newhouse, Kilbirnie; *Secretary*, John Howie, Connelstone, Kilbirnie. 2 Medals. 1892.
14. NEW CUMNOCK.—*Convener*, Edward C. Bruges, Dalgig, New Cumnock; *Secretary*, John Craig, House of Water, New Cumnock. 2 Medals. 1893.

Dumfriesshire.

15. SANQUHAR.—*Convener*, Abram Kerr, Castlehill, Durrisdeer, Thornhill; *Secretary*, Walter Robson, British Linen Company Bank, Sanquhar. 2 Medals. 1892.

Elginshire.

16. FORRES AND NORTHERN FAT CATTLE CLUB.—*Convener*, John M'Kessack, Kinloss, Forres; *Secretary*, William Fraser, Waterford Mills, Forres. 2 Medals. 1892.

Inverness-shire.

17. GLENURQUHART.—*Convener and Secretary*, Major W. Grant, Drumbuie, Glenurquhart. 2 Medals. 1892.
18. NORTH UIST.—*Convener*, Sir John Campbell Oide, Bart.; *Secretary*, James M. Fraser, Banker, Lochmaddy. 2 Medals. 1893.

Kirkcudbrightshire.

19. DALRY.—*Convener*, Oliphant Brown, Dalry, Galloway; *Secretary*, D. Cumming, Dalry, Galloway. 2 Medals. 1892.

Lanarkshire.

20. LANARKSHIRE.—*Convener*, John Clark Forrest, Banker, Hamilton; *Secretary*, James Cassels, Union Bank, Hamilton. 2 Medals. 1892.
21. SHETTLESTON AND CHRYSTON.—*Convener*, Alex. Murdoch, Gartcraig, Shettleston; *Secretary*, James Deunholme, Cardowan Farm House, Shettleston. 2 Medals. 1893.
22. SHOTTS, CALDERWATERHEAD.—*Convener*, Peter Forrest of Hairinyres, Shotts; *Secretary*, Thomas Loudoun, Muirhouse, Holytown. 2 Medals. 1892.

Perthshire.

23. MOULIN.—*Convener and Secretary*, Robert M'Gillewie, Union Bank, Dunkeld. 1 Medal. 1893.

Roxburghshire.

24. ROXBURGHSHIRE BREW-KEMPERERS. — *Convener*, William L. Johnston, Oxman Neuk, Jedburgh; *Secretary*, Thomas Clark, Pleasants Schoolhouse, Jedburgh. 2 Medals. 1893.

Applications from other Districts must be lodged with the Secretary of the Society *by 1st November next*.

RULES OF COMPETITION.

1. All Competitions must be at the instance of a local Society.
2. The classes for which Medals are granted must be in accordance with the list at pages 52 and 53. The Committee shall select the classes, and specify them in the return.
3. In each District the Convener (who must be a member of the Society appointed by the Directors) shall fix the time and place of Competition, appoint the Judges, and make all other necessary arrangements, in concurrence with the other members of the Society, and the local Association of the District.
4. The Money Premiums given in the District must be £2 for each Medal claimed.
5. The Medal for Sheep-Shearing shall not be awarded unless there are three competitors, and it shall always accompany the highest Money Premium. There must not be fewer than two competitors in all the classes.
6. Blank reports will be furnished to all the Conveners and Secretaries of the different Districts. These must, in all details, be completed and lodged with the Secretary *on or before the 1st of November next*, with the exception of green crop reports, which must be forwarded on or before the 20th of December, for the approval of the Directors, against whose decisions there shall be no appeal.
7. When a grant has expired, the District cannot apply again for aid for two years, and if no competition takes place in a District for two years the grant expires.

PLOUGHING COMPETITIONS.

The Minor Silver Medal will be given to the winner of the first or highest Premium at Ploughing Competitions, provided a Report in the following terms is made to the Secretary, within one month of the Competition, by a Member of the Society:—

FORM OF REPORT.

I, _____ of _____, Member of the Highland and Agricultural Society, hereby certify that I attended the Ploughing Match of the _____ Association at _____ in the county of _____ on the _____ when _____ ploughs competed; _____ of land were assigned to each, and _____ hours were allowed for the execution of the work. The sum of £ _____ was awarded in the following proportions, viz. :—

[*Here enumerate the names and designations of successful Competitors.*]

RULES OF COMPETITION.

1. All Matches must be at the instance of a local Society or Ploughing Association, and no Match at the instance of an individual, or confined to the tenants of one estate, will be recognised.

2. The title of such Society or Association, together with the name and address of the Secretary, must be registered with the Secretary of the Highland and Agricultural Society, 3 George IV. Bridge, Edinburgh.

3. Not more than one Match in the same season can take place within the bounds of the same Society or Association.

4. All reports must be lodged within one month of the date of the Match, and certified by a Member of the Highland and Agricultural Society who was present at it.

5. A Member can only report one Match, and a Ploughman cannot carry more than three Medals in the same season.

6. To warrant the grant of the Medal there must have been twelve ploughs in Competition, and Three Pounds awarded in Premiums by the local Society. The Medal to be given to the winner of the first or highest prize.

7. Ploughmen shall not be allowed any assistance, and their work must not be set up nor touched by others; on land of average tenacity the ploughing should be at the rate of an imperial acre in ten hours, and attention should be given to the firmness and sufficiency of the work below more than to its neatness above the surface

CLASS III.

COTTAGES AND GARDENS.

The following Premiums are offered for Competition in the Parishes after mentioned.

The Premiums are granted for two years.

PREMIUMS FOR BEST KEPT COTTAGES AND GARDENS.

1. Best kept Cottage	.	.	.	.	.	£1	0	0
Second best	.	.	.	.	.	0	10	0
2. Best kept Cottage Garden	.	.	.	.	.	1	0	0
Second best	.	.	.	.	.	0	10	0

Aberdeenshire.

1. BIRSE—*Convener*, W. E. Nicol, Ballogie, Aboyne; *Secretary*, William Adams, Schoolhouse, Finzean, Aboyne. Granted 1893.

Fife-shire.

2. PITLESSIE.—*Convener*, William Dingwall, Ramonic, Ladybank; *Secretary*, Henry Mitchell, Pitlessie, Ladybank. Granted 1893.

RULES OF COMPETITION.

1. Competitions may take place in the different parishes for Cottages and Gardens, or for either separately.

2. The occupiers of Lodges at Gentlemen's Approach Gates and Gar-

deners' Houses are excluded, as well as others whom the Committee consider, from their position, not to be entitled to compete. The inspection must be completed by the 1st of October. In making the inspection, the Conveners may take the assistance of any competent judges.

3. It is left to the Committee of the District to regulate the maximum annual rent of the Cottages, which may, with the garden, be from £5 to £7.

4. To warrant the award of full Premiums, there must not be fewer than three competitors in each class. If there are less than three competitors in each class, only half Premium will be awarded.

5. A person who has gained the highest Premium cannot compete again.

6. If the Cottage is occupied by the proprietor, the roof must be in good repair; if the roof is thatch, it must be in good repair, though in the occupation of a tenant. The interior and external conveniences must be clean and orderly—the windows must be free of broken glass, clean, and affording the means of ventilation. Dumphills, and all other nuisances, must be removed from the front and gables. In awarding the Cottage Premiums, preference will be given to Competitors who, in addition to the above requisites, have displayed the greatest taste in ornamenting the exterior of their houses, and the ground in front and at the gables.

7. In estimating the claims for the Garden Premiums, the judges should have in view—the sufficiency and neatness of the fences and walks; the cleanness of the ground; the quality and choice of the crops; and the general productiveness of the garden.

8. Reports, stating the number of Competitors, the names of successful parties, and the nature of the exertions which have been made by them, must be transmitted by the Conveners to the Secretary *on or before the 1st November next*.

9. When a grant has expired, the District cannot apply again for aid for two years.

Parishes desirous of these Premiums must lodge applications with the Secretary *on or before the 1st November next*.

MEDALS FOR COTTAGES AND GARDENS OR GARDEN PRODUCE.

The Society will issue annually two Minor Silver Medals to a limited number of local Associations or individuals, who at their own expense establish Premiums for Cottages or Gardens under £15 of Rent. The Medals may be awarded for best kept Cottage, and best kept Garden or Flower Plot, or Garden Produce.

Local Associations or individuals desirous of these Medals, must lodge applications with the Secretary *on or before the 1st November next*.

The Medals are granted for two years.

Aberdeenshire.

1. DYCE AND PARKHILL.—*Convener*, A. F. Nares, The Cottage, Parkhill, Aberdeen; *Secretary*, John Laing, Mill of Dyce, Dyce. 2 Medals. 1892.

Ayrshire.

2. GALSTON.—*Convener*, J. H. Turner, Portland Estates Office, Kilmarnock; *Secretary*, Abram Yendall, jun., 20 Barr Street, Galston. 2 Medals. 1892.

Dumbartonshire.

3. OLD KILPATRICK.—*Convener*, William Stewart, Milton Farm, Duntocher ; *Secretary*, William Reid, Parkview, Dalnair. 2 Medals. 1891. (In abeyance in 1892.)
4. VALE OF LEVEN AND DUMBARTON.—*Convener*, W. E. Gilmour, Woodbank, Alexandria, N.B. ; *Secretary*, Archd. M'Dougall, 1 Wilson Street, Alexandria, N.B. 2 Medals. 1893.

Fifeshire.

5. NEWBURGH.—*Convener*, Geo. Dun, Ormiston, Newburgh ; *Secretary*, David Williamson, Clunie, Newburgh. Granted 1890. (In abeyance in 1890 and 1891.)

Haddingtonshire.

6. EAST LOTHIAN.—*Convener*, The Master of Polwarth, Humble House, Upper Keith ; *Secretary*, George Badger, Haddington. 2 Medals. 1892.

Inverness-shire.

7. CROY.—*Convener*, Duncan Forbes of Culloden, Inverness ; *Secretary*, John M'Leod, Holly Cottage, Croy, Fort-George Station. 2 Medals. 1892.

Stewartry of Kirkcudbright.

8. CRIFFEL.—*Convener*, Sir Mark J. Stewart of Southwick, Bart., M.P., Dumfries ; *Secretary*, W. A. Forsyth, Preston Schoolhouse, Preston Mill, Dumfries. 2 Medals. 1892.

Lanarkshire.

9. CARNWATH.—*Convener*, George Russell, Carnwath ; *Secretary*, David Aitken, Carnwath. 2 Medals. 1892.

Nairnshire.

10. CAWDOR.—*Convener*, R. Fraser, Brackla, Nairn ; *Secretary*, George Mill, Piperhill, Nairn. 2 Medals. 1892.

Perthshire.

11. CHERRYBANK.—*Convener*, W. S. Ferguson, Pictouhill, Perth ; *Secretary*, R. H. Meldrum, Cherrybank, Perth. 2 Medals. 1892.
12. SCONE.—*Convener*, Alex. Macduff of Bonhard, Perth ; *Secretary*, Fred. Leahy, 67 Strathmore Street, Bridgend, Perth. 2 Medals. 1893.

Renfrewshire.

13. Sir John Maxwell Gardens' Society.—*Convener*, James Hunter, Braehead House, Cathcart ; *Secretary*, Robert K. Whitelaw, 19 Iligh Carteraigs, Pollokshaws. 2 Medals. 1893.

Stirlingshire.

14. CAMPSIE.—*Convener*, C. M. King, Antermoney House, Milton of Campsie ; *Secretary*, Watson Hunter, Lennoxton, Campsie. 2 Medals. 1893.

15. KILLEARN.—*Convener*, David Wilson, jun., of Carbeth, Killearn; *Secretary*, James Thomson, Killearn. 2 Medals. 1892.
16. MILTON OF CAMPSIE.—*Convener*, C. M. King, Antermoney House, Milton of Campsie; *Secretary*, John Gillespie, Public Hall, Milton of Campsie. 2 Medals. 1892.

REGULATIONS.

1. Competitions may take place in the different districts for Cottages and Gardens, or for either separately.

2. The annual value of each Cottage, with the ground occupied in the parish by a Competitor, must not exceed £15.

3. If Competition takes place for Garden Produce in place of the best kept Garden, such produce must be *bona fide* grown in the Exhibitor's Garden, and he will not be allowed to make up a collection from any other Garden.

4. To warrant the award of the Medals, there must not be fewer than three Competitors.

5. Blank reports will be furnished to the Conveners and Secretaries of the different Districts. These must, in all details, be completed and lodged with the Secretary *on or before the 1st November next*, for the approval of the Directors, against whose decisions there shall be no appeal.

6. When a grant has expired, the District cannot apply again for aid for two years, and if no competition takes place in a District for two years the grant expires.

IMPROVING EXISTING COTTAGES.

To the Proprietor in Scotland who shall report the Improvement of the greatest number of Cottages during the years 1890, 1891, and 1892—The Gold Medal.

BUILDING NEW COTTAGES.

To the Proprietor in Scotland who shall report the Erection of the greatest number of approved Cottages during the years 1889, 1890, 1891, and 1892—The Gold Medal.

RULES OF COMPETITION.

1. Claims for the Premiums must be lodged with the Secretary on or before the 1st of October next, to allow an inspection to be made of the different Cottages. The inspection will be conducted by a Committee of the Society's Members, and Reports must be transmitted to the Secretary *on or before the 1st November next*.

2. The annual value of the Cottage or Cottages separately, with the garden ground, must not exceed £5.

3. In estimating the claims of the Competitors, the following points will be kept in view: The external appearance of the Cottages; their internal accommodation; the arrangements of the out-houses; the means of drainage and ventilation; and the expense of the building or of the alteration, compared with its durability and accommodation. When the Cottages of

one Competitor are superior in style and comfort to those of another, though not so numerous, the Inspectors will give them preference, provided they amount at least to three, and have been erected at a moderate expense.

4. Parties competing will forward to the Society Plans, Specifications, and Estimates, of which, and of all information sent therewith, copies may be taken for publication, if the Society shall see fit, and the originals returned to the parties within six months, if desired.

HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND

GENERAL SHOW OF STOCK AND IMPLEMENTS AT DEAN PARK EDINBURGH

(ON 25TH, 26TH, 27TH, AND 28TH JULY 1893.)

LAST DAYS OF ENTRY.

IMPLEMENTS AND OTHER ARTICLES—Monday, 22d May.

STOCK, POULTRY, AND DAIRY PRODUCE—Monday, 19th June.

No Entry at ordinary fees taken later than those which are received at the Society's Office, Edinburgh, by first post, on 10 o'clock, on Monday morning (19th June). Post Entries for Cattle, Horses, Sheep, and Swine taken on payment of 10s. additional for each entry (Poultry at double fees) till Wednesday morning (21st June), at the Society's Office, Edinburgh, at 10 o'clock.

COVERED BOOTHS FOR OFFICES—Monday, 19th June.

President of the Society.

HIS ROYAL HIGHNESS THE DUKE OF YORK, K.G.

Convenor of the Local Committee.

SIR JAMES H. GIBSON-CRAIG OF RICCARION, BARR.

The District connected with the Show comprises the Counties of Edinburgh, Haddington, and Linlithgow.

REGULATIONS.

GENERAL CONDITIONS.

1. The Competition, except where otherwise stated, is open to Exhibitors from all parts of the United Kingdom.

2. Every Lot must be intimated by a Certificate of Entry, lodged with the Secretary *not later than Monday, 22d May, for Implements and other Articles, and Monday, 19th June, for Stock, Poultry, and Dairy Produce.* No Entry taken later than those which are received at the Society's Office, Edinburgh, by first post, or 10 o'clock, on Monday morning, 19th June. Post Entries for Cattle, Horses, Sheep, and Swine taken on payment of 10s. additional for each entry (Poultry at double fees) till Wednesday morning (21st June), at the Society's Office, Edinburgh, at 10 o'clock. Printed forms of Entry will be issued on application to the Secretary,

No. 3 George IV. Bridge, Edinburgh. Admission Orders will be forwarded to Exhibitors, by Post, previous to the Show.

Protests.

3. Protests against the awards of the Judges, or against a violation of the judging regulations, must be lodged with the Secretary not later than 9 A.M. on Wednesday, 26th July, and parties must be in attendance at the Committee Room, in the Showyard, at 9.30 A.M. that day, when protests will be disposed of. All protests must be accompanied by the deposit of £2, 2s., and if not sustained the sum will be forfeited at the discretion of the Directors.

4. Protests lodged for causes which the protester produces no good evidence to substantiate, will render him liable to be reported to the Board of Directors, with the view, if they see reason, of his being prohibited from again entering Stock for a General Show.

Society not liable.

5. The Society shall not be liable for any loss or damage which Stock, Poultry, Dairy Produce, Implements, or other articles may sustain at the Show, or in transit.

Decisions of Board.

6. The decisions of the Board of Directors are final in all questions respecting Premiums and all other matters connected with the Show, and it shall not be competent for any Exhibitor to appeal against such decisions to, nor seek redress in respect of them from, any other tribunal.

Covered Booths.

7. Covered Booths for Offices (9 feet by 9 feet), purely for business, not for exhibition of goods, can be had for £3, 10s. to Members and £5 to Non-Members. Intimation to be made to the Secretary on or before the 19th of June. Those applying after that date to pay double Entry Money, but no application can be received later than 7th July.

Lights and Smoking.

8. No lights allowed in the Yard at night, and Smoking is strictly prohibited within the Sheds. Those infringing this Rule shall be liable to a fine of 10s.

Water.

9. As the command of water in the Yard is limited, it is particularly requested that waste be avoided.

Restoring Turf.

10. When the ground requires to be broken, the turf must be carefully lifted and laid aside, and the surface must be restored to the satisfaction of the Society, and at the expense of the Exhibitor.

Subjection to Rules.

11. All persons admitted into the Showyard shall be subject to the Rules and Orders of the Directors.

Powers of Stewards.

12. The Stewards have power to enforce the Regulations of the Society in their different departments, and to bring to the notice of the Directors and Secretary any infringement thereof.

Attendants.

13. All persons in charge of Stock or other Exhibits shall be subject to the orders of the Secretary and Stewards.

Violation of Rules.

14. The violation by an Exhibitor of any one of the Regulations shall render him liable to the forfeiture of all Premiums awarded to him, or of such a portion as the Directors may ordain.

Railway Passes.

15. Railway Passes for unsold Stock and Implements must be applied for at the Committee Room in the Yard between 9 and 11 o'clock on the forenoon of Thursday and Friday.

Closing of Show.

16. The Show terminates at 5 P.M. on Friday, 28th July, and no animal or article can be withdrawn before that hour; steam Engines not till 6 o'clock. Stock and Implements may remain in the Yard till Saturday afternoon.

Payment of Prizes.

17. The Premiums awarded will be paid in November 1893, and, with the exception of the Tweeddale Gold Medal, Special Challenge Cups, and the Silver Medals, may be taken either in money or in plate.

STOCK AND POULTRY.

Admission of Stock.

18. Poultry and Stock will be admitted on Monday, 24th July, and, with the exception of Horses, must be in the Yard before 12 o'clock that

night. Horses must be in before 8 o'clock on the morning of Tuesday, except those entered for Jumping only, which do not require to be in till the day on which they compete before 11 o'clock forenoon. Judging to commence at 10 A.M. on Tuesday, 25th July. Exhibited on Tuesday, Wednesday, Thursday, and Friday, 25th, 26th, 27th, and 28th July. Stock may be admitted on Saturday the 22d July, but only by sending information to the Secretary before the 20th July.

19. An animal which has gained a first Premium at a General Show of the Society cannot again compete in the same class, but may be exhibited as Extra Stock. *Former Winners.*

20. All animals, except calves, foals, and lambs shown with their dams, must be entered in the classes applicable to their ages, and cannot be withdrawn after entry, or other animals be substituted in their place. *No substitution of animals.*

21. No animal shall be allowed to compete in more than one class, except for Jumping, Turn-out, and Clydesdale Sweepstake. *One class only.*

22. Shorthorn, Aberdeen-Angus, and Galloway animals must be entered in the herd-books, or the Exhibitor must produce evidence that his animal is eligible to be entered therein. *Herd-books.*

23. Stock must be *bona fide* the property and in the possession of the Exhibitor on the last day of Entry. *Ownership.*

24. The Schedule of Entry must be filled up so far as within the knowledge of the Exhibitor.

25. The name of the Breeder, if known, must be given, and if the Breeder is not known, a declaration to that effect, signed by the Exhibitor, must be sent along with the Schedule, and no pedigree will be entered in the Catalogue when the Breeder is unknown. *Particulars of entries.*

26. Should it be proved to the satisfaction of the Directors that an animal has been entered under a false name, pedigree, or description, for the purpose of misleading the Directors or Judges as to its qualification or properties, or that information required in the Schedule and known or easily ascertained by the Exhibitor has been withheld, such animal may be disqualified either before or after a prize has been awarded to it, and the case may be reported to the first Meeting of Directors, in order that the Exhibitor may be disqualified from again competing at the Society's Shows, or his case otherwise disposed of as the Directors may determine. *Entries disqualified.*

27. When an animal has previously been disqualified by the decision of any Agricultural Association in the United Kingdom, such disqualification shall attach, if the Exhibitor, being aware of the disqualification, fail to state it, and the grounds thereof, in his entry, to enable the Directors to judge of its validity. Any person who is disqualified from exhibiting at any Show in the United Kingdom shall be prohibited from exhibiting at any General Show of the Society, unless with the general consent of the Board.

28. Breeding Stock must not be shown in an improper state of fatness, and the Judges are requested not to award Premiums to overfed animals; and no Cattle or Sheep which have been exhibited as Fat Stock at any Show are eligible to compete in the Breeding Classes for the Society's Prizes. *Overfeeding.*

29. Horses and Cattle must be paraded when required by the Stewards, and under their direction; and the prize and commended animals will receive two Rosettes each, which must be attached to the head of the animal, one on each side. *Parades.*

30. Exhibitors shall be answerable for all acts, whether committed by themselves, their servants, or others in charge of their Stock, and shall be responsible for the condition of their animals during the whole time they remain in the Showyard. *Responsibility of Exhibitors.*

31. No animal shall be taken out of its stall after 10 A.M. during the Show except by order of the Stewards, or with permission of the Secretary. Those infringing this Rule shall be liable to a fine of 10s. *Authority for removal.*

32. Aged Bulls and Stallions must have had produce, and, along with Sires.

Two-year-old Bulls, Three-year-old Colts, and two Shear and aged Tups, have served within the year of the Show.

Cows.

33. All Cows must have had calves previous to the Show, and when exhibited they must either be in milk or in calf: if in milk, birth must have been within 9 months of the Show; if in calf, birth must be certified within 9 months after the Show. This Rule does not apply to animals in Family Groups. Ayrshire Heifers in calf must produce a calf within one month of the first day of the Show.

Family Groups.

34. Cows in the Family Groups must have had calves previous to the Show, and when exhibited they must be either in milk or in calf. Two-year-old Heifers in the Family Group Prizes must be certified to have been served before the Show, except Highland Heifers, which need not be served till 3 years old.

Ayrshire Cows.

35. All Milk Cows of the Ayrshire breed must be in the Yard on the evening of Monday, 24th July, before 8 o'clock, after which they will be inspected by the Veterinary Surgeon, or other official of the Society, between 8 and 9 o'clock, to see if they have been milked dry; and if not, they must be milked under his direction, and, after the judging, all Milk Cows must be milked morning and evening.

Tampering with animals.

36. Any artificial contrivance or device of any description found on or proved to have been used on an animal, either for preventing the flow of milk or for any other improper purpose, will disqualify that animal from being awarded a Premium, and the Owner of said animal shall be prohibited from again entering Stock for any of the Society's General Shows, or for such a period as the Directors may see fit.

In-calf Heifers.

37. Two-year-old Heifers—of the Shorthorn, Aberdeen-Angus, and Galloway breeds—must be in calf when exhibited, and the Premiums will be withheld till birth be certified, which must be within 9 months after the Show. This Rule does not apply to animals in the Family Groups.

Mares.

38. Animals of any age that have had a calf must be shown as Cows.
39. Agricultural Mares with foal at foot must have produced foals after 1st January 1893. In the case of a Mare whose foal has died, she shall without further entry be eligible to compete among the Yield Mares. Agricultural Yield Mares must produce a foal within 12 months from the first day of the Show.

Calves and Foals.

40. With reference to Regulations 33 and 37, birth of at least a seven months' calf must be certified; and in regard to Regulation 39, birth of at least a nine months' foal.

Concealing animals.

41. No rug shall be hung up so as to conceal any animal in a horse-box or stall, except with special permission of the Steward of that department.

Hunters.

42. Horses entered as Hunters must be tried over the leaping-bar if required by the Judges.

Soundness of Horses.

43. Judges are particularly requested to satisfy themselves, as far as possible, regarding the soundness of all Horses before awarding the Prizes, and to avoid giving a preference to animals showing symptoms of hereditary diseases. The Judges may consult the Society's Veterinary Surgeon if they deem it expedient. No protests on veterinary grounds will be received.

Ewes.

44. All Ewes must have reared lambs in 1893; and Ewes of the Black-faced and Cheviot breeds must be in milk, and have their lambs at foot.

Clipping.

45. Sheep must have been clift bare after 1st January 1893, and the Judges are instructed to examine the fleeces of the Sheep selected for Prizes, and to cast those on which they find any of the former fleece.

Sows.

46. Sows must have reared pigs in 1893 or be in pig; and Pigs must belong to the same litter, and be uncut.

Poultry.

47. In Poultry the Aged Birds must have been hatched previous to, and Cockerels and Pullets in, 1893.

Securing Cattle.

48. Bulls must be secured by nose-rings, with chains or ropes attached, or with strong halters and double ropes. All Cattle must be tied in their stalls.

49. Servants in charge of Stock must bring their own buckets or pails, *Feeding* and a piece of rope or sheep-net to carry their forage. Mangers, sheep *appliances.* and pig troughs, will be provided.

50. Loose-boxes will be provided for Stallions, Three, Two, and One *Accommo-* year-old entire Colts, and for Mares with foals at foot; closed-in stables *dation for* for all the other Horses, and covered accommodation for the whole of the *animals.* other Stock. Stalls for attendants on Cattle and Horses and closed-in accommodation for Shepherds will be provided at same rates as what is charged for Stock (see page 66).

51. Five days' supply of straw, hay, grass, and tares will be provided *Fodder.* free by the Society. Any additional fodder or other kinds of food required will be supplied at fixed prices in the Forage-yard. Any servant removing bedding from an adjoining stall will be fined in double the amount taken. Exhibitors may fetch their own cake or corn to the Yard, but not grass, tares, hay, or straw. Coops, food, and attendance for Poultry will be provided by the Society.

52. Cattle, Sheep, Swine, or Poultry cannot be removed from the Yard *Removal.* till 5 P.M. on Friday, 28th July, except on certificate by the Veterinary Surgeon employed by the Directors, countersigned by the Steward of the department and the Secretary.

53. Horses may be withdrawn at 6 o'clock on Tuesday evening, and at 8 o'clock on Wednesday and Thursday evenings, on a deposit of £5 for each animal, which shall be forfeited, along with any prize-money it may have gained, if the animal is not brought back. They must return between 7 and 7.30 the following morning, and those not in before 8 shall forfeit 10s. Horse passes to be applied for at the Committee Room between 5 and 6 P.M. on Tuesday, and the deposit, unless forfeited in whole or in part, will be returned between 12.30 and 2.30 on Friday. *With-* *drawal of* *horses over* *night.*

54. When the Stock is leaving the Yard, no animal is to be moved till ordered by those in charge of clearing the Yard. Those transgressing this Rule shall be liable to a fine of 10s., and detained till all the other Stock is removed. *Order in* *removal.*

JUDGING STOCK AND POULTRY.

55. On Tuesday, 25th July, no person will be admitted, except Servants in charge of Stock, till 8 A.M., when the Gates are opened to the public. *Opening* *Gates.*

56. The Judges will commence their inspection at 10 A.M. The space reserved for the Judges will be enclosed, and no encroachment shall be permitted. In no case shall a Premium be awarded unless the Judges deem the animals to have sufficient merit; and where only one or two lots are presented in a section, and the Judges consider them unworthy of the Premiums offered, it shall be in their power to award a lower prize, or to suggest the removal of any lot which appears to them unworthy of being placed in the Yard. *Judging.*

57. In addition to the Premiums, the Judges are authorised to award three Commendations in each section (except Poultry, where only two Prizes and one Commendation are to be awarded), if the entries are numerous and the animals of sufficient merit. These Commendations consist of—Very Highly Commended, Highly Commended, and Commended. *Commenda-* *tions.*

58. Ayrshire Cows which have not calved before the Show, whether entered in the class for Cows in Milk or for Cows in Calf, shall be judged along with the Cows in Calf, and Ayrshire Cows or Heifers which have calved before the Show—in whichever of the two classes entered—shall be judged along with Cows in Milk. *Ayrshire* *Cows and* *Heifers.*

59. One Member of Committee and one or two Directors shall attend each section of the Judges. It will be their duty to bring the animals out to *Attending* *Members.*

the Judges and to see that no obstruction is offered to them, and that the space reserved for them is not encroached on; to ticket the prize animals; to send the Nos. of prize animals to the Award Lectern; to assist the Judges in completing their reports; and should any difficulty arise, to communicate with the Stewards or Secretary.

60. It shall not be competent for any Exhibitor, nor for his Factor or Land-Steward, to act as a Judge or attending Member in any class in which he is competing.

DAIRY PRODUCE.

61. Dairy Produce will be received in the Showyard on Monday, 24th July, and till 8 A.M. on Tuesday, 25th July. Judged at 10 A.M. on Tuesday. Exhibited Tuesday, Wednesday, Thursday, and Friday.

62. Dairy Produce must have been made on the Exhibitor's farm this year. No Exhibitor shall show more than one lot in each class. At least 1 cwt. of the variety of Butter and 2 cwt. of that of the Cheese exhibited must have been made during the Season. The lots must be fair samples. No lot can be removed from the Yard till 5 P.M. on Friday, 28th July.

STALL RENT.

63. The following rates shall be paid by Exhibitors when making their Entries:—

	Members.	Non-Members.
	s. d.	s. d.
Cattle, each	15 0	25 0
Boxes for Stallions—3 and 2 year-old entire Colts, and Mares with Foals at foot	30 0	40 0
Boxes for one-year-old entire Colts	20 0	30 0
Stallions, 12 hands and under	15 0	20 0
Mares or Geldings, 12 hands and under	10 0	15 0
All other Horses, each	20 0	30 0
Sheep, per pen	10 0	15 0
Swine, per pen	15 0	20 0
Poultry, each entry	3 0	5 0
Dairy Produce, each entry	4 0	6 0
Stalls for Attendants and Stalls for Shepherds at the ends of Sheep-pens, same rates as above.		
Covered Booths for offices, 9 feet by 9 feet	70 0	100 0
Newspaper offices	£2, 10s.	

FINES FOR STOCK NOT FORWARD.

64. In order to lessen the number of vacant Stalls, the following fines shall be imposed on all Exhibitors whose animals are not forward: For Horses, 40s.; Cattle, 20s.; Sheep and Swine, 10s.; Poultry, 3s.;—this fine to be in addition to Entry Money. In the case of death or illness of an animal, a Veterinary Surgeon's Certificate is necessary for a remit of the fine. The absent animals must be reported by the Stewards to the Secretary.

EXTRA STALL FOR ATTENDANTS.

65. Exhibitors of Stock shall be entitled to take an extra Stall for the accommodation of their attendants without being liable to a fine, but they must state when making their Entry that the Stall is to be used for that purpose, and remit rent.

IMPLEMENTS AND OTHER ARTICLES.

66. Implements will be received in the Yard on Tuesday, 18th July, *Admission.* and till 5 o'clock on the afternoon of Monday, 24th July. Exhibited Tuesday, Wednesday, Thursday, and Friday, 25th, 26th, 27th, and 28th July. The Schedule of Entry must be filled up so far as within the knowledge of the Exhibitor, and prices must be stated.

67. No Money Prizes or Medals will be given by the Society for Im- *Premiums.* plements of any kind.

68. Agricultural Implements, and Implements and collections of *Refusing* articles not Agricultural, will be received for Exhibition, but the *Entries.* Secretary is entitled to refuse Entries from dealers in articles not deemed worthy of Exhibition.

69. In order to encourage exhibits of Agricultural Implements from *Local* operative Blacksmiths and Carpenters in the district of the Show, open *Operatives.* space will be provided for these in some less prominent part of the Yard at a charge of Entry Money of 1s. per running foot of frontage, 20 feet deep.

70. Implements will be entered in the following sections—viz., 1st, *Order of* Under Cover, for Agricultural Implements; 2d, Open, for Agricultural *Imple-* Implements; 3d, Exhibits not Implements of Husbandry, either under *ments.* cover or open, as may be deemed necessary by the Secretary; 4th, Motion Yard; 5th, Open space for Agricultural Implements from operative Blacksmiths and Carpenters in the district of the Show. Exhibitors must specify the space they require.

71. The articles of each Exhibitor must be all placed in one stand, *Placing* except Implements in motion, and must not on any account extend *Exhibits.* beyond the width allowed. No article shall be moved out of its stand, or the stand dismantled, till the termination of the Show, at 5 p.m. on Friday, 28th July. Those infringing this Rule shall be liable to a fine of 10s.

72. Exhibitors must arrange their own articles *within* the space *Arranging* allotted to them before 9 o'clock on Tuesday the 25th July, and to the *Exhibits.* satisfaction of the Stewards in charge of the Implement Yard.

73. All Machines requiring steam or fire must be entered as such in the Certificate, and will be placed in the Motion Yard. *Fuel.* *Coke only shall be used in all cases where fire is required after 10 o'clock A.M.* Those infringing this Rule shall incur a penalty of £5.

74. No Steam Engine shall be driven in the Yard at a greater speed *Steam* than 4 miles an hour. *Engines.*

75. Locomotive and Traction Engines and other Machines must not be moved from their places without permission of the Secretary or Stewards, and must not leave their stands till 6 p.m. on Friday.

76. There must be attached to each Implement, when forwarded to the *Consigning* Show, a label bearing the Exhibitor's name, and that of the Implement, *Imple-* as well as the number of the Exhibitor's stand. *ments.*

77. The carriage of all Implements must be prepaid.

STALL RENT.

78. Ground to be taken in spaces of 10 feet frontage by 20 feet deep, except in Motion Yard, which is to be 10 feet or any larger amount of frontage by 50 feet deep. Except for exhibits not agricultural, no boarding shall exceed 4 feet in height.

79. The following rates shall be paid by Exhibitors when making their Entries :—

	Members.	Non-Members.
Implement Shedding, 20 feet deep, 7 feet high, per 10 feet	£1 5 0	£1 15 0
Implements without Shedding, 20 feet deep, per 10 feet	1 5 0	1 15 0
Implement space in Motion Yard, without Shedding, 50 feet deep, per foot	0 2 6	0 3 6
And with Shedding, 20 feet deep, 10 feet high, per foot	0 6 0	0 8 0
Covered Booths for offices, 9 feet by 9 feet, each	3 10 0	5 0 0
Newspaper offices, each	£2, 10s	

ADMISSION TO YARD.

The Public will be admitted on Tuesday, 25th July, at 8 A.M. The inspection by the Judges commences at 10 A.M. The charges will be—Tuesday, from 8 A.M. till 5 P.M., 5s.; Wednesday, from 8 A.M. till 5 P.M., 3s.; and from 5 to 8 P.M., 1s.; Thursday, from 8 A.M. till 8 P.M., 1s.; Friday, from 8 A.M. till 5 P.M., 1s.

Members of the Society are admitted to the Showyard without payment, on exhibiting a "*Member's Ticket*," which is strictly not transferable. Tickets will be sent to all members residing in the United Kingdom whose addresses are known, and on no account will duplicates be issued. All Members not producing their tickets must pay at the gate, and the admission money will not be returned.

Exhibitors of Stock (not Members) are admitted free on producing their tickets.

Exhibitors of Implements (not Members) and their attendants will be entitled to free entry during the Show.

Tickets for attendants on Stock and Implements are not available to admit to the Yard between 11 A.M. and 5 P.M.; and any attendant requiring to leave the Yard during the day cannot be again admitted except by a special pass (to be applied for at the Ticket Gate), which must be given up on his return.

Placards, except those of the Society, are prohibited both inside the Showyard and on the outside of the Boundary Fence, with the exception of those belonging to Exhibitors, whose right is confined to their own stalls. No newspapers or any other article allowed to be carried about the Yard for sale or display. No strolling bands or musicians admitted.

No Carriages or Equestrians admitted without special leave from the Directors, and then only for Invalids. Bath-chairs may be brought in.

Premium Lists, Regulations, and Certificates of Entry may be obtained by applying at the Secretary's Office, No. 3 George IV. Bridge, Edinburgh.

All Communications should be addressed to JAMES MACDONALD, Esq., Secretary of the Highland and Agricultural Society of Scotland, No. 3 George IV. Bridge, Edinburgh.

LAST DAYS OF ENTRY.

IMPLEMENTS AND OTHER ARTICLES—Monday, 22d May.

STOCK, POULTRY, AND DAIRY PRODUCE—Monday, 19th June.

No Entry at ordinary fees taken later than those which are received at the Society's Office, Edinburgh, by first post, or 10 o'clock, on Monday morning (19th June). Post Entries for Cattle, Horses, Sheep, and Swine taken on payment of 10s. additional for each entry (Poultry at double fees) till Wednesday morning (21st June), at the Society's Office, Edinburgh, at 10 o'clock.

COVERED BOOTHS FOR OFFICES—Monday, 19th June.

RAILWAY ARRANGEMENTS.

The Railway Companies will be furnished with a list of the Exhibitors of Stock and Implements, after the 6th of July, and all applications for horse-boxes and trucks, and for information as to arrangements of Special Trains, must be made by the Exhibitors themselves with the Station-master where their stock is to be trucked.

The arrangements made by the Railway Companies for the conveyance of live Stock and Goods to and from the Show are indicated in the following, but exhibitors are recommended to apply to the respective companies for full particulars:—

1. Live Stock and Goods to the Show to be charged ordinary rates.
2. Live Stock and Goods from the Show, *if sold*, to be charged ordinary rates.
3. Live Stock and Goods from the Show, *if unsold*, to be conveyed at half rates back to the station whence they were sent, at owners' risk, on production of a certificate from the Exhibitor or the Secretary of the Show to the effect that they are unsold; failing production of such certificate, ordinary rates must be charged. The reduction to half rate is to be allowed only when the animals or goods are returned by the same route as that by which they were conveyed to the Show.

If the unsold Live Stock which was conveyed on the outward journey by Passenger Train in horse-boxes be required to be returned by Goods Train in cattle trucks, half the Goods Train rates must be charged.

If the unsold Live Stock which was conveyed on the outward journey by Goods Train in cattle trucks be required to be returned by Passenger Train in horse-boxes, half the Passenger Train rates must be charged.

4. Unsold Live Stock transferred from one Agricultural Show to another, in another part of the country, must be charged ordinary rates.

5. Unsold goods transferred from one Agricultural Show to another, in another part of the country, will be conveyed at half rates at owners' risk, on production of Certificate from the Exhibitor or the Secretary of the Show to the effect that they are unsold; failing production of such certificate, ordinary rates will be charged.

6. Poultry and Dogs to be charged ordinary rates both ways.

7. Horse-boxes, or other Passenger Train vehicle, must not be provided for the carriage of Live Stock sent by Goods Train and invoiced at Goods Train rates.

8. Provender conveyed to Shows with Live Stock is to be charged ordinary rates, except so much of the same as may be required on the journey.

9. Men in charge of Live Stock sent to compete for prizes conveyed to or from Shows by either Goods or Passenger Trains will be charged half the ordinary single fare when they actually travel in the same train and in charge of Stock; such reduced fare, however, will only be charged when a certificate, signed by the Exhibitor of the animals or his agent, or the Secretary of the Show, has been handed in and left with the station clerk at the time of booking. This concession will be given only to the extent of one man per vehicle.

10. The ordinary rates do not include delivery *to*, or collection *from*, the Show Ground.

11. Agricultural Societies' Show Plant must be charged at Class C rates, station to station.

12. Tents, Canvas, and other articles carried to Shows, not for exhibition, to be charged the ordinary rates both going and returning.

PREMIUMS

In addition to the Premiums, the Judges are authorised to award three Commendations in each Section (except Poultry, where only two Prizes and one Commendation are to be awarded), if the Entries are numerous and the animals of sufficient merit. These Commendations to consist of—Very Highly Commended, Highly Commended, and Commended.

The Directors are willing to accept suitable Cups, or Prizes of not less than £10 in value, for the recognised Breeds of Cattle, Horses, and Sheep, &c. Intimation should be made to the Secretary on or before 1st April.

CHAMPION CUPS

GIVEN BY

H.R.H. THE DUKE OF YORK, K.G.

1. CHAMPION CUP, value £10, for most points in Prizes for the Shorthorn, Aberdeen-Angus, Galloway, West Highland, and Ayrshire Breeds of Cattle.
2. CHAMPION CUP, value £10, for most points in Prizes for Horses.
3. CHAMPION CUP, value £10, for most points in Prizes for Sheep.

Conditions.

A First Prize shall count three points, a Second Prize two points, and a Third Prize one point. In the event of a tie, most First Prizes shall carry. Geldings, Wethers, and all animals in Extra Stock Classes, are excluded.

CATTLE

Class	SHORTHORN.	Premiums.		
		1st.	2d.	3d.
	Tweddendale Gold Medal for best Bull, £20.	£	£	£
1.	Bull calved before 1st Jan. 1891 . . .	15	10	5
2.	Bull calved on or after 1st Jan. 1891 . . .	15	10	5
3.	Bull calved on or after 1st Jan. 1892 . . .	12	8	4
	¹ Best Bull of any age in the three Classes, £20.			
	Breeder of Best Bull of any age in the three Classes,—The Silver Medal.			
4.	Cow of any age . . .	12	8	4
5.	Heifer calved on or after 1st Jan. 1891 . . .	10	5	3
6.	Heifer calved on or after 1st Jan. 1892 . . .	10	5	3
	Carry forward			£144

¹ Given by the Shorthorn Society.

Brought forward £144

ABERDEEN-ANGUS.

¹ Two Silver Cups, each of the value of £50, for the best Bull of any age and for the best Cow of any age (Heifers excluded) in the Aberdeen-Angus cattle classes. These are to be Challenge Cups, and are to be known as the "Ballindalloch Challenge Cups." They are offered under the following conditions: 1. The Directors shall assume charge of the Cups, and shall frame such rules for their safety as they may decide upon. 2. Each Cup shall be held by the winner for one year as a Challenge Cup, and shall become the property of the exhibitor who shall win it five times, not necessarily in succession. 3. The Society shall, at their own expense, cause to be engraved on each Cup each year, the year, the place of the Show, name of successful exhibitor, name and herd-book number of the animal, and name of its breeder. 4. The Society shall award to the breeder of the successful animals a Silver Medal, bearing that he is the breeder of the winner of the "Ballindalloch Challenge Cup." 5. In every other respect the Cups shall be won according to regulations which the Directors may from time to time enact.

Class	Premiums.		
	1st.	2d.	3d.
	£	£	£
7. Bull calved before 1st Dec. 1890 . . .	15	10	5
8. Bull calved on or after 1st Dec. 1890 . . .	15	10	5
9. Bull calved on or after 1st Dec. 1891 . . .	12	8	4
¹ Champion Cup, value £50, for the best Bull of any age in the three Classes (see p. 71).			
² Best Bull in the three Classes,—Gold Medal, value £8, 10s.			
Breeder of best Bull of any age in the three Classes,—The Silver Medal.			
10. Cow calved before 1st Dec. 1889 . . .	12	8	4
11. ¹ Cow three years old, £12, £8, £4.			
¹ Champion Cup, value £50, for the best Cow of any age in the two Classes (see p. 71).			
Breeder of best Cow of any age in the two Classes,—The Silver Medal.			
12. Heifer calved on or after 1st Dec. 1890 . . .	10	5	3
13. Heifer calved on or after 1st Dec. 1891 . . .	10	5	3
² Best Female Animal in the four Classes,—Gold Medal, value £8, 10s.			
			144

GALLOWAY.

14. Bull calved before 1st Jan. 1891 . . .	15	10	5
15. Bull calved on or after 1st Jan. 1891 . . .	15	10	5
16. Bull calved on or after 1st Jan. 1892 . . .	12	8	4
Breeder of Best Bull of any age in the three Classes,—The Silver Medal.			
17. Cow of any age	12	8	4
Carry forward			
	54	36	18 £288

¹ Given by Mr Macpherson Grant of Drumduan.

² Given by the Polled Cattle Society.

Brought forward		£288		
GALLOWAY— <i>contd.</i>		Premiums.		
Class	Brought forward	1st. £	2d. £	3d. £
18. Heifer calved on or after 1st Jan. 1891	.	54	36	18
19. Heifer calved on or after 1st Jan. 1892	.	10	5	3
		10	5	3
				144

HIGHLAND.

20. Bull calved before 1st Jan. 1891	.	15	10	5
21. Bull calved on or after 1st Jan. 1891	.	15	10	5
22. Bull calved on or after 1st Jan. 1892	.	12	8	4
¹ Best Bull in the three Classes, £10.				
Breeder of best Bull of any age in the three Classes,—The Silver Medal.				
23. Cow of any age	.	12	8	4
24. Heifer calved on or after 1st Jan. 1890	.	10	5	3
25. Heifer calved on or after 1st Jan. 1891	.	10	5	3
¹ Best Female in the three Classes, £10.				
				144

AYRSHIRE

26. Bull calved before 1st Jan. 1891	.	15	10	5
27. Bull calved on or after 1st Jan. 1891	.	12	8	4
28. Bull calved on or after 1st Jan. 1892	.	8	5	3
² Champion Cup, value £10, for best Bull entered in the Ayrshire Herd-Book.				
Breeder of Best Bull of any age in the three Classes,—The Silver Medal.				
29. Cow in Milk, any age	.	10	7	3
30. Cow of any age in Calf, or Heifer calved in 1890 in Calf and due to calve within one month of the first day of the Show	.	10	7	3
² Champion Cup, value £10, for best Cow entered in the Ayrshire Herd-Book.				
31. Heifer calved on or after 1st Jan. 1891	.	10	5	3
32. Heifer calved on or after 1st Jan. 1892	.	8	5	3
				144

JERSEY.³

33. ⁴ Bull of any age	.	£10	£5	£2
34. ⁴ Cow in Milk, calved before 1891	.	10	4	2
35. ⁴ Heifer in Milk or in Calf, calved in 1891	.	8	3	1
36. ⁴ Heifer calved in 1892	.	5	2	—

£720

¹ Given by Mr Smith of Ardornish.

² Given by the Ayrshire Cattle Herd-Book Society, assisted by Mr Cross of Knockdon and Mr Mitchell, Barcheskia.

³ These classes are open to pure-bred Jersey cattle, whether entered in the Jersey Herd-Book or not, that have been in Scotland for not less than two months prior to the first day of the Show. Rule 35, page 64, applies to Jersey cows.

⁴ Given by Breeders of Jersey Cattle in Scotland and a few others, per Mr Wardlaw Ramsay.

HORSES

FOR AGRICULTURAL PURPOSES.

CAWDOR CHALLENGE CUP, VALUE 50 GUINEAS, FOR BEST MARK.

Conditions of Competition.—1. These Cups are, through the kindness of the Right Honourable the Earl Cawdor, President for the year 1891-92, offered by the Clydesdale Horse Society of Great Britain and Ireland—one for the best Clydesdale Stallion or Entire Colt registered in the Clydesdale Stud-Book, and the other for the best Clydesdale Mare or Filly registered in the Clydesdale Stud-Book, entered in any of the Draught Horse classes, at the show or shows at which they may be competed for. 2. The Council of the Clydesdale Horse Society shall, at a meeting held not later than the month of August in any year, decide at what show or shows the “Cawdor Challenge Cups” shall be competed for in the year immediately following. 3. Either of these Cups must be won three times by an exhibitor (but not necessarily in consecutive years or with the same animal) before it becomes his absolute property; and immediately after an award has been made, and official notification thereof has been received by the Secretary of the Clydesdale Horse Society from the Secretary of the Society under whose auspices the competition has taken place, the name of the winner, and of the animal with which the Cup has been won, will be engraven on the Cup. 4. The winner of either of the Cawdor Challenge Cups, other than the absolute winner, shall, before delivery thereof is made to him, give security to the Clydesdale Horse Society that he shall surrender the same to the Society and deliver it at the Society’s office when called upon to do so. 5. Until the Cup or Cups be won outright, the winner of either Challenge Cup will receive the Clydesdale Horse Society’s Silver Medal as a memento of his winning the Cup; and the said Medal shall bear an inscription specifying the show at which, the date on which, and the name of the animal with which the Challenge Cup has been won, as well as the name of the owner. In name of the Council of the Clydesdale Horse Society, and as approved, first, by its Committee, Messrs R. Sinclair-Scott, John M. Martin, and James Park, and finally, by the Right Hon. the Earl Cawdor, its President.

ARCHD. MACGILLIVRAY, *Secretary.*

For the above Cup all former prize animals at the Society’s Shows, now disqualified from competing in the ordinary classes, are permitted to compete. The Clydesdale Horse Society to have the option of photographing the winner for publication in the Clydesdale Stud-Book.

Class	Premiums.			
	1st.	2d.	3d.	4th.
	£	£	£	£
37. Stallion foaled before 1st Jan. 1890	15	12	8	4
38. Entire Colt foaled on or after 1st Jan. 1890	15	12	8	4
39. Entire Colt foaled on or after 1st Jan. 1891	15	10	6	3
40. Entire Colt foaled on or after 1st Jan. 1892	12	7	4	2
Carry forward	57	41	26	13

No animal is allowed to compete in more than one Class, except for Jumping, Turus-out. and Dray Sweenstakes.

FOR AGRICULTURAL PURPOSES		Premiums.			
—continued.		1st.	2d.	3d.	4th.
Class		£	£	£	£
	Brought forward	57	41	26	13
41.	Derby of 1893,—Entries closed 31st Jan. 1893.—Yearling Colt.				
	¹ Best Stallion in the five Classes, —Champion Premium of £10.				
	Breeder of Best Male Animal of any age in the four Classes,—The Silver Medal.				
42.	Mare of any age, with Foal at foot .	15	10	5	3
43.	Yeld Mare foaled before 1st Jan. 1890	10	6	3	2
44.	Filly foaled on or after 1st Jan. 1890	10	6	3	2
45.	Filly foaled on or after 1st Jan. 1891	10	6	3	2
46.	Filly foaled on or after 1st Jan. 1892	10	6	3	2
	Best Mare or Filly registered in the Clydesdale Stud-Book,—Cawdor Challenge Cup, value 50 guineas (see p. 74).				
47.	Derby of 1893,—Entries closed 31st Jan. 1893.—Yearling Filly.	<hr/>			
					£254

ROAD OR FIELD.		1st.	2d.	3d.	
		£	£	£	
18. ²	Mares suitable for Breeding Hunters, in foal to, or with foal at foot by, a thoroughbred Horse serving in Scotland,—Four Prizes, £12, £8, £3, £2.				
49.	Hunter, Mare or Gelding, 4 years old and upwards, up to 14 st. or upwards	10	5	3	
50.	Hunter, Mare or Gelding, 4 years old or upwards, up to 12 st.	10	5	3	
	Best Hunter in Classes 49 and 50, —Champion Prize	10	—	—	
51.	Mare or Gelding, 3 years old	10	5	3	
52.	Mare or Gelding, 2 years old	8	4	2	
53. ³	Yearling Colt or Filly, the produce of thoroughbred Stallions that have served in Scotland in 1892, out of Mares of any breed,—Five Prizes, £10, £7, £5, £2, £1.	<hr/>			
					78

Carry forward £332

No animal is allowed to compete in more than one Class, except for Jumping, Turns-out, and Derby Sweepstakes.

¹ Given by Mr Lockhart, Mains of Aircs.

² Given by Mr Gilmour of Montrave.

³ Given by Captain G. D. Clayhills Henderson of Invergowrie, R.N.

Brought forward				£332
Premiums.				
HACKNEYS IN HAND OR SADDLE.				
Class	1st.	2d.	3d.	
	£	£	£	
54. Stallion any age over 15 hands .	10	5	2	
55. Brood Mare, with Foal at foot, or to foal this season to a registered Sire All animals entered in Classes 54 and 55 must be registered in the Hackney Stud-Book.	7	4	2	
56. Mare or Gelding, 4 years old and upwards, 15 hands and upwards .	6	4	2	
57. Mare or Gelding, 4 years old and upwards, 14-2, and under 15 hands .	6	4	2	
58. Mare or Gelding, 3 years old .	5	3	1	
59. Colt or Gelding, 2 years old .	5	3	1	
60. Filly, 2 years old .	5	3	1	
61. Colt, 1 year old .	5	3	1	
62. Filly, 1 year old .	5	3	1	
Best Hackney Stallion,—Champion Prize of .	10	0	0	
Best Female Registered Hackney in Classes 55, 56, 57, 58, 60, and 62, Champion Prize of .	10	0	0	
¹ Cold Medal, value £15, for the best animal in the Hackney Classes, registered in the Hackney Stud-Book.				119
The Scotch Committee of the Hackney Horse Society gives £55 towards the above Prizes				
All animals entered in Classes 58 to 62 inclusive must be got by registered Hackney Sires.				
Classes 54 to 62 shall be judged by a qualified Hackney Judge from England, selected from the list of those who have judged at the London Shows.				
TURNS-OUT.				
63. Best Turn-out of single Horse, Harness, and Trap, to be driven in the ring, 15 hands and upwards .	8	4	2	
64. Best Turn-out of single Horse, Harness, and Trap, to be driven in the ring, under 15 hands .	8	4	2	
PONIES.				28
65. Stallion, over 12, not exceeding 15 hands .	4	2	1	
Carry forward	4	2	1	£479

No animal is allowed to compete in more than one Class, except for Jumping, Turns-out, and Clydesdale Sweepstakes.

¹ Given by the Hackney Horse Society.

		Brought forward £479		
		Premiums.		
PONIES— <i>contd.</i>		1st.	2d.	3d.
Class	Brought forward	£	£	£
66. Mare or Gelding, between 13 and 14½ hands		4	2	1
67. Mare or Gelding, between 12 & 13 hands		4	2	1
68. Stallion, under 12 hands		4	2	1
69. Mare or Gelding, under 12 hands		4	2	1
		<hr/>		
SHETLAND PONIES.				
70. Stallion, above 3 years, not exceeding 10½ hands		4	2	1
71. Mare or Gelding, above 3 years, not exceeding 10½ hands		4	2	1
72. ¹ Stallion or Mare under 3 years of age, £4 and £2.				
73. ² Best Group of not less than four Shetland Ponies shown in the foregoing classes, £4, 4s.		<hr/>		
				35
				14

REGULATIONS FOR JUMPING COMPETITIONS.

There shall be Jumping Competitions at the afternoon parades, on Wednesday, Thursday, and Friday, 26th, 27th, and 28th July.

Class	<i>Wednesday, 26th July.</i>			
74. Horses—open		20	10	5
75. Ponies, 14½ hands and under		5	3	1
<i>Thursday, 27th July.</i>				
76. Horses that have never won a £20 prize for jumping		10	6	3
77. Ponies, 14 hands and under		5	3	1
<i>Friday, 28th July.</i>				
78. Horses that have never won a £10 prize for jumping		10	6	3
79. Ponies, 13½ hands or under		3	1	—
		<hr/>		
				95

¹ Given by Mr C. Macpherson (Grant of Drumduan, Mr Gavin Hadden of Dalnunnzie, and Mr George Bruce, Tochnmeal.

² Given by Sir Allan Mackenzie, Bart.

£623

Ponies, winners of first prize on previous days, excluded.

Entries—£1 for horses, 10s. for ponies on Wednesday, and 10s. and 5s. on Thursday and Friday—for each competition to be made before 6 P.M. the day previous, when a ticket of admission to Showyard will be given. Unless they are entered in another class they need not be in the Yard till 11 A.M.

On Wednesday, Thursday, and Friday horses must jump at the morning parade, as directed by the Steward of horses, or they will not be allowed to compete for prizes that afternoon.

Horses entered only for the morning Competitions may leave the Yard at 6 P.M. Stalls will be provided for them to stand in during the day.

SHEEP

Class	BLACKFACED.	Premiums.		
		1st.	2d.	3d.
		£	£	£
80.	Tup three shear or upwards . . .	10	5	3
81.	Tup two shear	10	5	3
82.	Shearling Tup	10	5	3
83 ¹	Five Shearling Tups, bred and fed by Exhibitor, £4, £2, £1 = £7.			
	¹ Best Ram of any age in these Classes, £10.			
84.	Three Ewes above one shear, with their Lambs at foot . . .	8	4	2
85. ¹	Tup Lamb, bred and fed by Exhibitor, £3, £2, £1 = £6.			
86.	Three Shearling Ewes or Gimmers . .	8	1	2
	¹ Sheep (entered in any of the above Classes, Male or Female) carrying the fleece best adapted for protecting the animal in a high exposed and stormy climate, £2, £1, 10s. = £3, 10s.	<hr/>		82
	CHEVIOT.			
87.	Tup above one shear	10	5	3
88.	Shearling Tup	10	5	3
89.	Three Ewes above one shear, with their Lambs at foot . . .	8	4	2
90.	Three Shearling Ewes or Gimmers . .	8	4	2
		<hr/>		64
	BORDER LEICESTER.			
91.	Tup above one shear	10	5	3
92.	Shearling Tup	10	5	3
93.	Three Ewes above one shear . . .	8	4	2
94.	Three Shearling Ewes or Gimmers . .	8	4	2
		<hr/>		61
	SHROPSHIRE.			
95.	Tup above one shear	6	4	2
96.	Shearling Tup	6	4	2
97.	Three Ewes above one shear . . .	5	3	2
98.	Three Shearling Ewes or Gimmers . .	5	3	2
		<hr/>		44
	Carry forward	<hr/>		£254

¹ Given by West of Scotland Breeders of Blackfaced Sheep, per Mr Howatson of Glenbuck. Animals competing for these prizes may be drafted from the regular Classes—viz., 80, 81, 82, 84, 86—or may be entered separately in Classes 83 and 85.

	Brought forward	...	...	£254
		Premiums.		
		1st.	2d.	3d.
		£	£	£
Class	SILROPSHIRE— <i>contd.</i>			
99.	¹ Three Shearling Tups, bred in Scotland by Exhibitor, £3, £2.			
	¹ Three Tup Lambs, do., £3, £2.			
	¹ Three Ewe Lambs, do., £3, £2.			
	OXFORD DOWNS.			
100.	Tup above one shear . . .	5	3	—
101.	Shearling Tup . . .	5	3	—
102.	Three Ewes above one shear . . .	5	3	—
103.	Three Shearling Ewes or Gimmers . . .	5	3	—
				32
	HALF-BRED.			
104.	Tup above one shear . . .	10	5	3
105.	Shearling Tup . . .	10	5	3
106.	Three Ewes above one shear . . .	8	4	2
107.	Three Shearling Ewes or Gimmers . . .	8	4	2
				64
	EXTRA SECTIONS.			
108.	Three Blackfaced Wethers, one shear	4	2	—
109.	Three Cheviot Wethers, one shear .	4	2	—
110.	² Three Cross-bred Wethers, one shear	4	2	—
				18
				£368

SWINE

		Premiums.		
LARGE WHITE BREED.		1st.	2d.	
Class		£	£	
111.	Boar	4	2	
112.	Sow	4	2	
113.	Three Pigs, not above 8 months old	4	2	
				£18
WHITE BREED OTHER THAN LARGE.				
114.	Boar	4	2	
115.	Sow	4	2	
116.	Three Pigs, not above 8 months old	4	2	
				18
Carry forward				£36

¹ Given by breeders of Shropshire sheep in Scotland, per Mr Buttar. Shearling Rams competing for these prizes may be drawn from Class 96, or entered specially in Class 99.

² Cross-bred Wethers must be the offspring of any Whitefaced or Short-Woolled Tup with Blackfaced Ewes, or the progeny of Blackfaced Tups with Whitefaced or Short-Woolled Ewes.

		Brought forward	...	..	£36
				Premiums	
BLACK OR BERKSHIRE.			1st.	2d.	
Class			£	£	
117. Boar	.	.	4	2	
118. Sow	.	.	4	2	
119. Three Pigs, not above 8 months old	.	.	4	2	
					18
					£54

EXTRA STOCK

Animals not included in the Classes for Competition may be exhibited as Extra Stock, and will receive Honorary Premiums when specially commended, as follows:—

CATTLE AND HORSES.

Very highly commended	.	Medium Gold Medal.
Highly commended	.	Minor Gold Medal.
Commended	.	The Silver Medal.

SHEEP AND SWINE.

Very highly commended	.	Minor Gold Medal.
Highly commended	.	The Silver Medal.
Commended	.	Medium Silver Medal.

POULTRY

First Premium — ONE SOVEREIGN; *Second Premium* — TEN SHILLINGS; one Commended Ticket—in all the Sections of Poultry.

Aged Birds must have been hatched previous to, and Cockerels and Pullets in, 1893.

	Class	Class
DORKING— <i>Silver Grey</i>	1. Cock	2. Hen
	3. Cockerel	4. Pullet
DORKING— <i>Coloured</i>	5. Cock	6. Hen
	7. Cockerel	8. Pullet
COCHIN-CHINA	9. Cock	10. Hen
	11. Cockerel	12. Pullet
BRAHMAPOOTRA	13. Cock	14. Hen
	15. Cockerel	16. Pullet
SCOTCH GREY	17. Cock	18. Hen
	19. Cockerel	20. Pullet

	Class	Class
HAMBURG	21. Cock	22. Hen
	23. Cockerel	24. Pullet
PLYMOUTH ROCK	25. Cock	26. Hen
	27. Cockerel	28. Pullet
MINORCA .	29. Cock	30. Hen
	31. Cockerel	32. Pullet
LEGHORN .	33. Cock	34. Hen
	35. Cockerel	36. Pullet
LANGSHAN	37. Cock	38. Hen
	39. Cockerel	40. Pullet
WYANDOTTE .	41. Cock	42. Hen
	43. Cockerel	44. Pullet
ANY OTHER PURE BREED	45. Cock	46. Hen
	47. Cockerel	48. Pullet
GAME— <i>Black or Brown Reds</i>	49. Cock	50. Hen
	51. Cockerel	52. Pullet
GAME— <i>Any other Pure Breed</i>	53. Cock	54. Hen
	55. Cockerel	56. Pullet
BANTAMS— <i>Any Pure Breed</i>	57. Cock	58. Hen
	59. Cockerel	60. Pullet
DUCKS— <i>White Aylesbury</i>	61. Drake	62. Duck
	63. Drake (Young)	64. Duckling
DUCKS— <i>Rouen</i>	65. Drake	66. Duck
	67. Drake (Young)	68. Duckling
DUCKS— <i>Any other Pure Breed</i>	69. Drake	70. Duck
	71. Drake (Young)	72. Duckling
TURKEYS— <i>Any Pure Breed</i>	73. Cock	74. Hen
	75. Cock (Poult)	76. Hen (Poult)
GEESE— <i>Any Pure Breed</i>	77. Gander	78. Goose
	79. Gander (Young)	80. Gosling

Amount of Poultry Premiums, £120.

DAIRY PRODUCE

Class	Premiums.			
	1st.	2d.	3d.	4th.
	£	£	£	£
1. Cured Butter, not less than 28 lb. .	4	2	1	
2. Powdered Butter, not less than 7 lb. .	4	2	1	
3. Fresh Butter, three 1-lb. rolls .	4	2	1	
4. Cheddar Cheese, 56 lb. and upwards .	6	4	2	1
5. Sweet-Milk Cheese, under 56 lb. .	4	2	1	
	<hr/>			
				£41

No Exhibitor to show more than one lot in any Class.

IMPLEMENTS

No Trials of Implements will be held by the Society at this Show.

The Petroleum Engines, exhibited in the Showyard, will be inspected and reported on.

TRIAL OF WEIGHBRIDGES

The Farmers' Supply Association of Scotland (Ld.) offer a prize of £10, 10s. for the best Farmer's Cart and Cattle Weighbridge.

CONDITIONS.

1. Must weigh not less than 50 cwt.
2. The weigh-table must not be less than 70 inches long and 40 inches broad.
3. Must be adaptable for weighing carts, cattle, sheep, and pigs.
4. Must stand tests required by the Standards Department of the Board of Trade.
5. The price of whole complete, including Cage or Pen for Live Stock, must not exceed £20 (twenty pounds).
6. The successful Exhibitor shall be required to guarantee that he will supply to the Farmers' Supply Association of Scotland, Limited, if desired, and as they may order them, machines at the same price and similar in every way to the Weighbridge obtaining the prize, and that during the next two years, and in all to the number of 50.

JUDGING.

1. The Judges shall be two practical Farmers, an Engineer, and an Inspector of Weights and Measures, to be appointed by the Directors of the Highland and Agricultural Society.
2. These shall be instructed to make their award according to the following points of excellence, and according to subjoined ratio for each :—

Maximum of points obtainable, 100.

	Points.
For price of Machine complete, moderateness thereof	25
For construction of Weighbridge, strength, simplicity, &c.	30
For erection of Weighbridge, simplicity, facility, &c.	15
For weighing properties, sensitiveness, uniformity of indication when table is weighted at varying points	15
For Cage or Pen for Live Stock, simplicity, suitability, facility of attachment, &c.	15
	<hr/> 100

EXHIBITION OF BINDERS

An exhibition of Binders at work will be held in the district of the Show during Harvest of 1893. Particulars will be had on application to the Secretary.

HIGHLAND INDUSTRIES AND FISHERIES

Entries to be made with JAMES MACDONALD, Esq., 3 George IV. Bridge, Edinburgh, not later than Monday, 22d May, from whom Schedules of Entry can be obtained.

Class	Premiums.	
	1st.	2d.
	£	£
1. Two Plaids, Native Wool, Hand-spun, Home-dyed, and Handloom-woven	2	1
2. Web, not less than 25 yards Tweed, Cheviot Wool, Hand-spun, Home-dyed, and Handloom-woven	3	1
3. Web, not less than 25 yards Tweed, Black-faced Wool, Hand-spun, Home-dyed, and Handloom-woven	3	1
4. Web, 25 yards Tweed, Light Texture, for Ladies' Dresses, Native Wool, Hand-spun, Home-dyed, and Handloom-woven	3	1
5. Web, not less than 16 yards, of Shetland Tweed, of Shetland Wool, Hand-spun, Home-dyed, and Handloom-woven	2	1
6. Six pair Stocking Hose, Hand-spun, Home-dyed, and Knitted by Exhibitor,—two pair plain Ribbed, two pair Diced Tartan, two pair Fancy	2	1
7. Twelve pair Socks of Blackfaced Wool, Hand-spun, Home-dyed, and Knitted by Exhibitor	2	1
8. Twelve pair Socks of Cheviot Wool, Hand-spun, Home-dyed, and Knitted by Exhibitor	2	1
9. Fine White Shetland Shawl	3	1
10. Thick Coloured Shetland Shawl	3	1
11. Collection of not less than five Articles, of Native Wool, Hand-spun, Home-dyed, and Knitted by Exhibitor	2	1
12. Varieties of Yarn, not less than eight cuts, Hand-spun, Home-dyed, and of Native Wool; 4 cuts of each colour	2	1
13. Working Model of Sea-fish Hatching Apparatus from floating ova	2	1
14. Box for Carriage of Fresh Fish to Market	2	1
15. Collection of Trout and Salmon Flies home-made	2	1

£50

All Exhibits to be sent to JAMES MACDONALD, Esq., Showyard, Dean Park, Edinburgh, not later than Thursday, 20th July.

ABSTRACT OF PREMIUMS.

(GIVEN BY THE SOCIETY.

1. Cattle	£720	0	0
2. Horses	623	0	0
3. Sheep	368	0	0
4. Swine	51	0	0
5. Poultry	120	0	0
6. Dairy Produce	11	0	0
7. Highland Industries and Fisheries	50	0	0
8. Seven Silver Medals to Breeders	1	18	0
9. Extra Stock, say	100	0	0

£2080 18 0

Less — Amounts contributed by Edinburgh
Agricultural Association and Scotch Com-
mittee of the Hackney Horse Society,
noted below

115 0 0

£1965 18 0

(GIVEN BY

1. H.R.H. The Duke of York, K.G.	£30	0	0
2. The Shorthorn Society	20	0	0
3. Mr C. Macpherson Grant of Drumduan, Cups, &c.	124	0	0
4. Edinburgh Agricultural Association	60	0	0
5. Polled Cattle Society,—Two Gold Medals	17	0	0
6. Ayrshire Herd-Book Society, &c.	20	0	0
7. Breeders of Jersey Cattle, per Mr Wardlaw Ramsay	52	0	0
8. Mr Smith of Ardtornish	20	0	0
9. Mr Lockhart, Mains of Airies	10	0	0
10. Cawdor Cup	52	10	0
11. Mr Gilmour of Montrave	25	0	0
12. Captain G. D. Clayhills Hender- son of Invergowie, R.N.	25	0	0
13. Scotch Committee of the Hackney Horse Society	55	0	0
14. The Hackney Horse Society	15	0	0
15. Admirers of Shetland Ponies (see page 77)	10	1	0
16. West of Scotland Breeders of Blackfaced Sheep, per Mr Howatson of Glenbuck	26	10	0
17. Scotch Breeders of Shropshire Sheep, per Mr D. Buttar	15	0	0
18. Tweeddale Gold Medal	20	0	0

597 1 0

£2563 2 0

JAMES MACDONALD, *Secretary.*

APPENDIX (C).

LIST OF MEMBERS

OF

THE HIGHLAND AND AGRICULTURAL
SOCIETY OF SCOTLAND

ARRANGED ACCORDING TO COUNTIES
AND SHOW DISTRICTS

1893

By the Charter of 1834 the Society consists of two classes, Ordinary and Honorary or Corresponding Members. The number of Honorary or Corresponding Members resident in the United Kingdom must not exceed twenty, but with power to the Society to elect as Honorary Associates persons resident abroad, not subjects of her Majesty, who may have been benefactors to the Society, or who are distinguished for their skill in Art or Science, provided that the number of such Foreign Associates shall not exceed twenty.

By a Bye-law passed in 1873, with reference to the Supplementary Charter of 1856, successful Candidates for the Society's Agricultural Diploma are thereby eligible to be elected free Life Members of the Society.

Candidates for admission to the Society must be proposed by a Member, and are elected at the half-yearly General Meetings in January, and June or July, but it is not necessary that the proposer should attend the meeting.

The Ordinary Subscription is £1, 3s. 6d. annually, which may be redeemed by one payment, varying according to the number of previous annual payments, from £7, 1s. to £12, 12s. Proprietors farming the whole of their own lands, whose Rental on the Valuation Roll does not exceed £500 per annum, and all Tenant Farmers, Secretaries or Treasurers of Local Agricultural Associations, Factors Resident on Estates, Land Stewards, Foresters, Agricultural Implement Makers, and Veterinary Surgeons, none of them being also owners of land to an extent exceeding £500 per annum, are admitted on a subscription of 10s. annually, which may be redeemed by one payment, varying according to the number of previous annual payments, from £3 to £5, 5s. Subscription payable on election, and afterwards annually in January.

According to the Charter, "Any person elected an Ordinary Member of the Society who shall not have objected to his election, on the same being intimated to him by the Secretary, shall not be entitled to resign or withdraw his name as a Member of the Society, unless he shall have paid up his Life Subscription, or shall have previously settled and paid in Annual Contributions a sum equal to that fixed by the Society at the time of his election, to be paid by Members as the purchase of a Life Subscription in lieu and in redemption of the Annual Payments." The Life Subscription for a Member paying £1, 3s. 6d. is £12, 12s., and for a Member paying 10s., £5, 5s.

Members having Candidates to propose are requested to state whether the Candidate should be on the £1, 3s. 6d. or 10s. list.

Members of the Society receive the 'Transactions' free on application, and are entitled to consult the Chemist and Botanist at reduced rates—to apply for District Premiums—to report Ploughing Matches for the Medal—to free admission to the Show-Yard, and to exhibit Stock and Implements at reduced rates. Firms are not admitted as Members, but if one partner of a firm becomes a Member, the firm is allowed to exhibit at Members' rates.

Members having Candidates to propose are requested to send their names to JAMES MACDONALD, Esq., 3 George IV. Bridge, Edinburgh.

By a Resolution of the Directors, 2d February 1887, the list of Members, arranged according to Counties, has been so made up that no Member shall vote in more than one Show District for the nomination of Directors. Members finding any mistakes are requested to report the same to JAMES MACDONALD, Esq., 3 George IV. Bridge, Edinburgh.

The following is the List of Counties constituting the Show Districts :—

	PAGE
1. Glasgow, for the Counties of Argyll, Ayr, Bute, Lanark, and Renfrew,—	
Argyll	5
Ayr	7
Bute	3
Lanark	8
Renfrew	11
2. Perth, for the Counties of Fife, Forfar (Western Division), Kinross, and Perth (Eastern Division),—	
Fife	12
Forfar (Western Division)	14
Kinross	15
Perth (Eastern Division)	16
3. Stirling, for the Counties of Clackmannan, Dumbarton, Perth (Western Division), and Stirling,—	
Clackmannan	19
Dumbarton	19
Perth (Western Division)	20
Stirling	21
4. Edinburgh, for the Counties of Edinburgh, Haddington, and Linlithgow,—	
Edinburgh	23
Haddington	27
Linlithgow	28
5. Aberdeen, for the Counties of Aberdeen, Banff, Forfar (Eastern Division), and Kincardine,—	
Aberdeen	30
Banff	32
Forfar (Eastern Division)	33
Kincardine	34

4 *List of Counties constituting Show Districts.*

6. Dumfries, for the Counties of Dumfries, Kirkcudbright, and Wigtown,—

Dumfries	35
Kirkcudbright	37
Wigtown	38

7. Inverness, for the Counties of Caithness, Elgin, Inverness, Nairn, Orkney and Shetland, Ross and Cromarty, and Sutherland,—

Caithness	10
Elgin	40
Inverness	41
Nairn	42
Orkney and Shetland—	
Orkney	43
Shetland	43
Ross and Cromarty	43
Sutherland	44

8. Border District, for the Counties of Berwick, Peebles, Roxburgh, and Selkirk,—

Berwick	45
Peebles	16
Roxburgh	46
Selkirk	47

England	49
Ireland	52
Foreign Countries	53
Members whose Residences are unknown	54
Honorary Members	57
Honorary Associates	57
List of Diploma Holders, Free Life Members	58
List of Holders of First-Class Certificate in Forestry, Free Life Members	59

LIST OF MEMBERS

ARRANGED ACCORDING TO COUNTIES AND SHOW DISTRICTS.

*The Members marked * have been Presidents, and † Vice-Presidents.*

Her Most Gracious Majesty THE QUEEN.	Admitted 1872
* His Royal Highness The PRINCE OF WALES.	1873

1.—GLASGOW DISTRICT.

EMBRACING THE

COUNTIES OF ARGYLL, AYR, BUTE, LANARK, AND RENFREW.

ARGYLL.

Admitted
1881 Allan, Alex., of Aros, Tobermory
1876 Allan, Robt., Glenmore, Lochgilphead
1852 Allan, T. W. M., of Glenfeochan, Oban
1889 Anderson, Wm. D., Ardsheal, Ballachulish
1889 Andrew, David, Knockstaple, Campbelltown
1844*† Anselm, The Duke of, K.G., Inveraray Castle, Inveraray
1881 Ballingall, J. S. R., Falloway, Islay
1868 Berry, Walter, Glenstriven, Toward
1882 Black, Donald, Junior, Clachan, Lochlynishhead, Inveraray
1891 Blair, John Simpson, Melfort, Kilmelfort
1884 Boyd, Wm., Killundine, Oban
1873 Brown, Alexander, Bankor, Oban
1876 Bruce, Henry, of Ederline, Lochgilphead
1881 Buchanan, Dr Alexander, Tiroc, Tobermory
1881 Buchanan, Angus, Druhnatoran, Strontian
1863 Buchanan, Dun., Auchinbreck, Colintreive
1880 Cameron, Allan Gordon, of Barcaldine Castle, Tayside
1871 Cameron, John, Drulinvalle, Fort-William
1887 Campbell, Alex., of Achendarroch, Lochgilphead
1891 Campbell, Alex. E., Duiletter, Dalmally
1865 Campbell, Lt.-Col., of South Hall, Colintreive
1880 Campbell, Alex. James Henry, of Dunstaffnage, Oban
1875 Campbell, Capt. D., of Invernell and Ross, Ardrishaig
1882 Campbell, Edward P., Captain, 42d Highlanders, South Hall, Colintreive

Admitted
1885 Campbell, Lt.-Col. H. Burnley, of Ballimore, Tigh-na-bruaich
1888 Campbell, James, of Jura, Greenock
1888 Campbell, James, Shanvalle, Ledaig
1877 Campbell, James, Succoth Villa, Lochgilphead
1874 Campbell, John, of Kilberry, Tarbert
1877 Campbell, John, Glenforsa, Aros, Mull
1890 Campbell, Robt. C. Graham, of Shivan, Lochend Lodge, Ardrishaig
1877 Clark, Andrew, Islay
1869 Clark, Archd., Benecorum, Dunoon
1853 Clark, Archibald, Inverchapple, Kilmun
1867 Clark, Lachlan, Tancy, Campbelltown
1886 Clark, Robert, Skerholin, Campbelltown
1873 Coltart, Robert, Achaterny, Ardnamurchan
1885 Corson, Thomas, Auction Mart, Oban
1882 Craig, Hugh, Ardoran, Oban
1891 Craig, William, Carsaig, Mull, Oban
1891 Craig, William, Tiroran, Mull
1884 Cresser, Peter C., Brackley, Dalmally
1889 Cunningham, Robert, Kilkivan, Campbelltown
1867 Dickie, Robt., Killoonan, Campbelltown
1882 Douglas, J., Macharloch, Southend, Campbelltown
1878 Duncan, Alex., Duart, Anchnacraig, Mull
1881 Duncan, R., Royal Hotel, Tigh-na-bruaich
1884 Elliot, Walter, Ardtornish, Oban
1885 Finlay, C. Campbell, of Castle Toward, Greenock
1870 Finlay, Kirkman, of Dunlossit, Islay
1870 Fletcher, B. J. C., Dunans, Colintreive
1874 Forsyth, James N. M., of Quinish, Tobermory
1884 Fraser, Duncan, Hotel, Dalmally
1867 Gardyne, Col. C. G., of Glenforsa, Mull

Admitted

- 1889 Gemmell, John, Dalrioch, Campbeltown
 1875 Gillespie, John, Temperance Hotel, Oban
 1891 Gillies, John, Barnacarrie, Kilninver, Oban
 1891 Graham, Archd. W., Erray, Tobermory
 1889 Graham, Robt. C., of Skipness, Whitehouse
 1888 Graham, William, of North Erines, Tarbert (8 Royal Crescent, Glasgow)
 1872 Grant, A., Cull House, Inveraray
 1891 Greenbank, Jonathan C., Gigha, Greenock
 1873 Hall, Allan, Degnish, Ardmaddy, Easdale, Oban
 1875 Hall, Jas. M., Killeen House, Tayinloan
 1888 Hamilton, George, Crear, Tarbert, Lochfyne
 1865 Hay, C., Ardbeg, Islay
 1882 Holm, Alex., Ballimore, Kilmichael, Lochgilphead
 1853 Hosack, William, Oban
 1889 Hunter, James, Machribeg, Campbeltown
 1857 Hunter, William, Lilybank, Campbeltown
 1889 Kinloch, Charles, Ballymeanach, Portsonachan
 1850 Lamont, James, of Knockdow, Greenock
 1875 Lloyd, T., of Minard Castle, Inveraray
 1869 Lorne, The Marquis of, K.T.
 1888 Lothian, James, Campbeltown
 1862 Macarthur, John, Banker, Inveraray
 1873 M'Callum, Dun., Glenmacrie, Oban
 1861 M'Callum, John, Westbourne, Kilm
 1879 M'Coll, Duncan, Glachan House, Lismore, Oban
 1885 M'Gulloch, Allan, Kilbride, Glenfeochan, Oban
 1861 Macdiarmid, H., Island House, Tiree, Oban
 1882 Macdiarmid, Robert, Castles, Lochawe
 1874 Macdonald, Alex., Nether Largie, Lochgilphead
 1889 Macdonald, Allan, Maam, Inveraray
 1872 M'Dougall, Col. Chas. A., of Dunollie, Oban
 1882 MacDougall, James Patten, Gallanach, Oban
 1892 M'Dougall, Major S., of Lunga, Daill House, Lochgilphead
 1873 Macfarlane, Lewis, Invermay, Lochgoilhead
 1889 M'Gee, William, Carnsriemore, Kilmartin
 1863 M'Gibbon, David, Ardnacraig, Campbeltown
 1870 MacGregor, Donald, of Ardgartan, Glen-croce (Royal Hotel, Edinburgh)
 1883 MacGregor, Donald, Solicitor, Oban
 1844 MacIntyre, J., Lochvoil Cottage, Oban
 1877 Mackay, A. F., Carskey House, Campbeltown
 1880 M'Keand, P., Scour, Bunessan, Mull
 1892 M'Kechnie, Dugald of Tenga, Oban (30 Northumberland Street, Edinburgh)
 1855 M'Kechnie, Neil, Inveraray
 1860 MacKechnie, Jas., Blarreen House, Taynult
 1878 Mackellar, John, Crossaig, Tarbert
 1878 Mackellar, Peter, Crossaig, Tarbert
 1872 Mackenzie, John, of Knipco, Oban
 1891 Mackenzie, J. Hugh, Fracadal, Tobermory
 1857 M'Kerral, A., Brunerican, Campbeltown
 1876 MACKINNON, Sir Wm., of Balnaskill, Bart., Glachan, Kintyre
 1874 M'Lachlan, D., Lochgilphead
 1886 MacLachlan, Jn., of MacLachlan, Inveraray (12 Abercromby Place, Edinburgh)
 1870 MacLaine, M. G., of Lochbuie, Oban

Admitted

- 1888 M'Laren, Dun., Banker, Tarbert, Lochfyne
 1875 M'Lachie, W., Ballygreggan, Campbeltown
 1875 M'Lean, A. J., of Pennycross, Oban
 1849 Macleod, John N., of Kintarbert, Glen-saddell, Campbeltown
 1848 Maconeal, H., of Ugadale, Campbeltown
 1860 M'NILL, Maj.-Gen. Sir J. C., of Colonsay, V.O., K.C.M.G., K.C.B.
 1876 M'Nicol, John, Achandarroch, Ballachulish
 1882 M'Phail, John, Seallasdale, Mull
 1891 Macpherson, Colin D., Corpach, Fort William
 1888 Macpherson, James, Maam, Inveraray
 1891 M'Vean, Colin A., Kilfinichen, Pennyghael, Mull
 1878 Malcolm, William M., Fassifern, Fort William
 1874 Masson, John, Tobermory
 1881 Maxwell, Wm., Baraskomel, Campbeltown
 1891 Melkie, R. A., Ri-Crinn, Lochgilphead
 1874 Menzies, John, the Hotel, Banavie
 1861 Mercer, John, Ardnadam, Sandbank
 1889 Mitchell, Archibald, Clockiel, Campbeltown
 1857 Mitchell, James, Dalintober, Campbeltown
 1889 Mitchell, James B., Aros, Campbeltown
 1855 Morrison, Charles, of Islay, Bridgend
 1877 Munro, D. H. C., of Kenlochlaich, Appin
 1888 Munro, John, Ironmonger, Oban
 1888 Nicolson, Neil, Auchgoyle, Tigh-na-brualach
 1887 Orde, Colin Campbell, Kilmory, Lochgilphead
 1858 ORDE, Sir John W. P. C., of Kilmory, Bart.
 1882 Patten, James, Gallanach, Oban
 1870 Pollok, John, of Ronachan, Glachan
 1889 Ralston, Gav., Kilmichael, Campbeltown
 1882 Reid, Peter, Port Ellen, Islay—*Free Life Member*
 1892 Robertson, Alexander, Chemist, Oban
 1884 Robertson, John, Craig Farm, Dalnally
 1891 Rontledge, Joseph, Annet, Fort William
 1888 Scott, Adam, Succoth, Dalnally
 1891 Shairp, Alex., Land Agent and Architect, Oban
 1884 Shankland, Wm., Killichoran, Lismore
 1875 Sinclair, John, Fanans, Taynult
 1884 Smith, T. V., of Ardtornish, Oban
 1881 Smith, W. Anderson, Ledaig
 1881 Sproat, George B., Writer, Tobermory
 1881 Sproat, Wm., Procurator-Fiscal, Tobermory
 1875 Stevenson, A. S., of Ach-na-cloich, Connell
 1879 Stewart, Rev. A. M., Inverchaolain, Greenock
 1863 Stewart, Com. D., R.N., Knockrioch, Campbeltown
 1881 Stewart, John Lorne, of Coll, Oban
 1871 Stewart, Capt. J. C., of Fasnacloich, Ledaig
 1858 Stewart, Robt., of Kinlochmoidart, Salen (8 Rothesay Terrace, Edinburgh)
 1892 Stuart, Mrs E., Dalness, Glenetive, Taynult
 1899 Sutherland, John D., Oban
 1891 Thomson, Duncan, Inverynie, Tigh-na-brualach
 1859 Thorburn, David, St Mary's, Tobermory
 1875 Turner, A., Kilchamaig, Whitehouse, Kintyre
 1858 Turner, D., Corachaive, Sandbank
 1883 Webster, G. K., of Invercreran, Ledaig

Admitted

- 1882 Weir, Alexander, Gallowhill, Campbeltown
 1876 Whyte, D. C., Ballymore, Sandbank
 1865 Wilson, Peter, Linsalg, Tigh-na-bruaich
 1863 Wylie, James, Factor, Inveraray
 1887 Young, William, Drum, Campbeltown

AYR.

- 1882 AILSA, The Marquis of, Culzean Castle, Maybole
 1892 Allan, Alex. Young, Munnoch, Dalry
 1867 Allan, Andrew, Munnoch, Dalry, Ayr
 1882 Alston, George, Loudoun Hill, Darvel
 1890 Alston, H. R., Swindridge Muir, Dalry
 1850 BLAIR, Sir E. H., of Blairquhan, Bart., Maybole
 1882 Bone, William, Shalloch Park, Girvan
 1865 Boyd, Col. J. Hay, of Townend, Symington, Kilmarnock
 1890 Brisbane, C. T., of Brisbane, Largs
 1866 Brown, David, Banker, Maybole
 1865 Brown, James, Whippark, Kilmarnock
 1877 Brown, John, Lissensmoss, Kilwinning
 1870 Bruges, Edward C., Dalrig, New Cumnock
 1889 Caldwell, John, Bogside, Dundonald
 1887 Campbell, W. K. E., of Nether Place, Mauchline
 1857 Clark, William, Shawhill, Monkton
 1891 Clark, W. K., Currah Farm, Girvan
 1876 Clelland, James, Ballgreen, Dalrymple
 1877 Cochrane, James, Minnieveay, Dalmellington
 1870 Craig, Daniel, Royal Bank House, New Cumnock
 1865 Crawford, J., Milnstonford, W. Kilbride
 1850 Cunningham, D., Chapelton, Ardrossan
 1880 CUNINGHAME, Sir W. M., of Corsehill, Bart., Glenmore House, Maybole
 1849 Cunningham, W. C. S., of Caprington, Kilmarnock
 1857 Deans, J. Y., of Kirkstyle, Kilmarnock
 1889 Dempster, Jas. R., yr. of Ladyton, Stoneyhall, Galston
 1890 Drummond, Hugh, Craighead of Rodinghead, Mauchline
 1898 Duke, Guy, Braehead Office, Kilmarnock
 1887 Dunlop, And. T. L., Morriston, Maybole—*Free Life Member*
 1869 Dunlop, Gabriel, Castle Farm, Stewarton
 1875 Dunlop, Quintin, Morriston, Maybole
 1871 Dunlop, Robert, Aulton, Kilmaurs
 1889 Dunlop, Wm. Hamilton, of Doonside, Ayr
 1868 EGLINTON and WINTON, The Earl of, Eglinton Castle, Irvine
 1880 FERGUSON, John Blackburn, Doonholm, Ayr
 1854 FERGUSON, Right Hon. Sir James, of Kilkerran, Bart., M.P., Maybole
 1875 Foulde, A. R., of Clerkland, Stewarton
 1891 Fraser, M. P., Blacknig, New Cumnock
 1885 Gemmell, Andrew, Lugton Ridge, Beith
 1875 Gemmell, G. C., Upper Whitehaugh, Muirkirk
 1875 Gilmour, Alex., Annfield House, Irvine
 1875 Gilmour, James, Orchardton, Cumnock
 1881 GLASGOW, The Earl of, Kelburn, Fairlie
 1874 Glasgow, R. B. R., of Montgreenan, Kilwinning
 1884 Guthrie, Wm., Crossburn, Troon
 1890 Hamilton, Claude, Carbleston, Ayr
 1858 Hamilton, Hugh, of Pinmore, Ayr
 1865 Hamilton, J., Wallace Bank, Kilmarnock
 1839 Hamilton, Lieut.-Col. John, of Sundrum, Ayr
 1887 Hamilton, John W., of Cairnhill, Kilmarnock

Admitted

- 1889 Hannah, John M., Girvan Mains, Girvan
 1878 Hay, J. F. Dalrymple, Dunlop House, Dunlop
 1874 Henderson, Richard, Portland Estates Office, Kilmarnock—*Free Life Member*
 1880 Herron, Thos., Trees, Maybole
 1892 Highet, M. G., Portland Street, Kilmarnock
 1879 Holmes, Wm., Fullerton Street, Irvine
 1865 Houldsworth, Henry, Carrick House, Ayr
 1857 Houldsworth, J. H., Rozella, Ayr.
 1865 Houldsworth, J. M., Ayr
 1857 Houldsworth, Wm., Mount Charles, Ayr
 1876 Howatson, W. M. S., Carskeoch, Patna
 1865+Howatson, Chas., of Dornel, Glenbuck
 1886 Howie, James, Burnhouses, Kilmarnock
 1857 Howie, John, Hurlford, Kilmarnock
 1889 Howie, Thomas, Orangefield, Monkton
 1867 Hunter, David, 3 Barns Terrace, Ayr
 1878 Hunter, Thomas, Implt. Maker, Maybole
 1859 Hyndman, Henry C., of Springside, West Kilbride
 1877 Inglis, Robert, Loveston House, Girvan
 1885 Johnstone, James, Alloway Cottage, Ayr
 1870 Kennedy, William, Clarendon, Ayr
 1874 Kennedy, William, Rankinston, Patna
 1869 Kerr, James, Lochend, Kilbirnie
 1882 Kilpatrick, Jas., Craigie Mains, Craigie
 1873 Latta, William, Darnalloch, Cumnock
 1865 Lindsay, John, of Fulshaw, Stewarton
 1878 Lindsay, Thomas, Townend, Craigie
 1889 Littlejohn, James, Genuch, Ayr
 1874 M'Connell, Wm., of Knockkollan, Girvan
 1879 M'Farlane, Richard, County Club, Ayr
 1887 M'Jannet, Archibald C., Irvine
 1882 M'Kerrell, R. M., of Hillhouse, Dundonald
 1878 M'Kersie, J., Cunningham House, Muirkirk
 1886 M'Min, Thos. M'C., Wellwood, Muirkirk
 1882 Marshall, Francis, of Park, Girvan
 1877 Marshall, John, Implt. Maker, Maybole
 1875 Martin, Donald T., of Girgenti, Irvine
 1858 Meikle, Jas., Fichon, Dalry, Ayr
 1886 Middlemas, Wm., Solicitor, Kilmarnock
 1882 Montgomerie, Rob., Lessnessock, Ochiltree
 1889 Montgomery, John, Meadowhead, West Kilbride
 1892 Morton, William, Highbowhill, Newmills
 1889 Murdoch, Alex., Anchenflower, Ballantrae
 1889 Murdoch, James, Burnton, Dalrymple, Ayr
 1857 Murray, J., Dumfries Arms Hotel, Cumnock
 1884 Niven, Richard, Airlie, Ayr
 1890 Osborne, Robert, Drumjoan, Ochiltree
 1870 Oswald, Rich. A., of Auchincruive, Ayr
 1888 Paton, Hugh (W. Samson & Co.), Kilmarnock
 1857 Picken, James, Leigh Langside, Craigie
 1881 Pollock, A., Manchine
 1889 Pollock, R. M., Midulston, Ayr
 1876 Rankine, Alex. M., Lochlands, Maybole
 1857 Rodger, Hugh, Hillhead, Kilmarnock
 1882 Scott, C. W., Hawkhill, Largs
 1890 Scott, John, C.B., of Hawkhill, Largs
 1875 Scott, Robert Sinclair, Burnside, Largs
 1872 Shaw, Chas. G., Ayr
 1893 Shaw, D. W., County Buildings, Ayr
 1888 Skeoch, Peter, Boydston, Beith
 1870 Sloan, John, Alton Albany, Barr, Girvan
 1869 Sloan, Wm., Brieryside, Monkton
 1889 Smith, Robert, Shields, St. Quivox, Ayr
 1880 Smith, Thomas, The Castle, Maybole
 1882 Somervell, James, of Sorn, M.P., Mauchline

Admitted

- 1887 Somerville, Wm., Hapland Mills, Dunlop
 1879 Speir, Robert, Rosebank, Largs
 1885 Steel, Alex., Burnhead, Newmilns
 1869 Steven, Hugh, Skeldon House, Dalrymple
 1885 Stevenson, Allan, Architect, Ayr
 1888 Stevenson, David, Silverwood, Kilmarnock
 1885 Stevenson, David, Auchengate, Troon
 1888 Stevenson, John, Balig, Ballantrae
 1864 Stevenson, John, Changue, Cumnock
 1885 Stewart, James, Blackhouse, Skelmorlie
 1858 Stewart, James, Heathfield, Irvine
 1882 Stuart, A., Muirhouse, Symington, Kilmarnock
 1876 Taylor, H., Kamishill, Hurlford, Kilmarnock
 1882 Thornycroft, J. B., Portland Iron Works, Hurlford
 1886 Tivendale, William, Burn House, Galston
 1891 Todd, Hugh, Harperland, Dundonald
 1884 Turner, J. H., Portland Estates Office, Kilmarnock
 1867 VERNON, Hon. G. R., Auchans House, Kilmarnock
 1887 Wallace, H. R., Inverdon, Ayr
 1886 Wallace James, Piperhill, Ochiltree
 1875 Wallace, Robert, Auchenbrain, Mauchline
 1874 Wardrop, Robert, Garlaiff, Cumnock
 1864 Watson, John, Kilmarnock
 1868 Weir, W., of Kildonan, Portland Iron Works, Kilmarnock
 1880 Whyte, Robert, East Raws, Kilmarnock
 1882 Willison, Alex., Easterhill, Dairy
 1873 Willison, George, Woodbank, Dailly
 1858 Wilson, James, Banker, Kilmarnock
 1882 Wright, R. P., Downan, Ballantrae—*Free Life Member*
 1884 Wyllie, Alex., Holmbyre, Ardrossan
 1868 Young, John, jun., Ayr

BUTE.

- 1855 Allan, James, Clauchlands, Lamlash
 1870 Allan, James, jun., Balnacoolie, Brodick
 1889 Anderson, Francis, Bute Estate Office, Rothesay
 1869† Bute, The Marquis of, K.T., Mount Stuart, Rothesay
 1880 Dickie, Wm. P., Cranslagvourty, Rothesay
 1889 Duncan, Chas., Little Kilmory, Rothesay
 1875 Duncan, Jas., Bannatyne Mains, Rothesay
 1892 Duncan, James L., Birgedale, Knock, Rothesay—*Free Life Member*
 1880 Gilmour, Thomas, Kilchattan Tile Works, Rothesay
 1865† HAMILTON and BRANDON, The Duke of, K.T., Brodick Castle, Arran
 1858 Hutcheson, Robert, Maynish Cottage, Brodick
 1888 Lyon, George, Kildavaig, Ardlamont, Greenock
 1889 M'Alister, Robert, Mid Ascog, Rothesay
 1889 MacAlister, James, Melkie Kilmory, Rothesay
 1861 Macdonald, P., The Douglas Hotel, Brodick
 1880 Macfie, Hugh, Ballycaul, Rothesay
 1889 Macfie, John, Lubas, Rothesay
 1875 M'Intyre, Daniel, Dunalunt, Rothesay
 1881 M'Intyre, Wm., Mount Stuart, Rothesay
 1878 Mackay, Arch. M., Bruchag, Rothesay
 1876 M'Pherson, Don., Queen's Hotel, Rothesay
 1878 Murray, Patrick, Strabane, Brodick
 1881 Stuart, J. Windsor, Rothesay

Admitted

- 1870 Tod, James, Glouree, Lamlash
 1864 Tod, William, Glenree, Lamlash
 1887 Wallace, John, Glenkhill, Lamlash

LANARK.

- 1875 Addie, John, Viewpark, Uddingston
 1893 Aikman, C. M., M.A., B.Sc., 188 St Vincent Street, Glasgow
 1882 Aikman, Thomson, Glasgow
 1875 Alexander, Jas., 145 North Street, Glasgow
 1864 Allan, Alex., Waddiefield, Hamilton
 1884 Allan, David, Clarkston, Busby
 1888 Allan, Gavin, 54 Old Dumbarton Road, Glasgow
 1892 Allan, Henry, Carstairs House, Carstairs
 1877 Allan, James, Kirklands, Dolphinton
 1878 Anderson, Robert, Arden Cottage, Caldercruix, Airdrie
 1870 Andrew, W. J., Banker, Coatbridge
 1872 ANSTRUTHER, Sir W. C. J. C., of Carmichael, Bart., Thankerton
 1875 BAIN, Sir J., 8 Park Terrace, Glasgow
 1864 Bain, James, Bank of Scotland, Glasgow
 1887 Bain, W. P. C., Lochrin Iron Works, Coatbridge
 1878 Baird, Archibald, 67 Robertson Street, Glasgow
 1875 Baird, Hugh, Rosslyn House, Kelvin-side, Glasgow
 1886 Barr, Duncan C., Factor, Hamilton
 1862 Barr, James, jun., Whiteshaw, Carluke
 1882 Beckett, C. R., Rockvilla Oil Mills, Port Dundas
 1877 Beith, Gilbert, 7 Royal Bank Place, Glasgow
 1876 Bell, William, Sheriffslands, Thankerton
 1882 Bertram, A. D., Kersewell, Carnwath
 1852 Bertram, Wm., of Kersewell, Carnwath
 1882 Bertram, Wm., jr. of Kersewell, Carnwath
 1887 Blackie, Alfred, 97 Milton Street, Glasgow
 1881 Brock, H., V.S., 112 North Street, Glasgow
 1878 Brown, James, of Orchard, Carluke
 1891 Brown, John Hillhead, Airdrie—*Free Life Member*
 1882 Brown, John, Shields, East Kilbride
 1857 Brown, John, Biggar
 1877 Brownlie, R., Bogside, Newmains, Carluke
 1875 Brownlie, T., New Club, Glasgow
 1849 Buchanan, Lieut.-Col. Carrick, C.B., of Drumpellier, Coatbridge
 1876 Buchanan, Capt. J. R. G., of Scotstone, Eastfield House, Cambuslang
 1884 Cadzow, Robert, Borland, Biggar
 1888 Calderwood, John, Kirkton, East Kilbride
 1858 Campbell, William, Solicitor, Hamilton
 1877 Cathcart, J. P., 135 Buchanan St., Glasgow
 1849 Chancellor, J. G., of Shieldhill, Biggar
 1882 Chapman, Wm., Meadowhead, Airdrie
 1857 Christie, T. C., of Bedley, Chryston
 1889 Clark, Alexander, Todlaw, Lesmahagow
 1881 Clark, W. A., Cruthersland, East Kilbride
 1889 Clarke, John, Hamilton
 1879 Clarkson, Alexander, Pretts Mills, Thankerton
 1888 Clement, And., Cheese Merchant, Glasgow
 1890 COLERBROOKE, Sir Edward, of Crawford, Bart., Abington
 1871 Comrie, Alex., 12 Colebrooke Street, Hillhead, Glasgow

Admitted

1876 Coubrough, Wm., Sornfallow, Wiston, Biggar
 1864 Cousland, James, 82 Hope Street, Glasgow
 1873 Cowan, Jas., 28 St Vincent Pl., Glasgow
 1880 Craig, James, Robroyston, Bishopbriggs
 1888 Craig, John, High Ploughland, Strathaven
 1882 Craig, John, of Bellsfield, Blantyre
 1887 Craig, John, Jellyhill, Bishopbriggs
 1885 Craig, John, South Halls, Strathaven
 1889 Craig, James, Raith View, Hamilton Drive, Bothwell
 1884 Cranston, Stuart, 28 Buchanan Street, Glasgow
 1882 Crawford, Alexander, Netherton, Carmunnock
 1864 Cunningham, John M., Glasgow
 1882 Cunningham, T. D. S., Auchlochan, Lesmahagow
 1860 Dalziel, George, Goldieles, Uddingston
 1870 Davidson, Hugh, of Braedale, Lanark
 1886 Denholm, Alex., Springfield, Biggar
 1889 Douglas, Rev. Sholto Douglas Campbell, of Douglas Support, Coatbridge
 1875 Duff, J., Factor, Blackwood, Lesmahagow
 1876 Dunlop, C. R., of Quarter, Hamilton
 1891 Dunlop, Colin, jun., Hutton Bank, Hamilton
 1889 Dunn, Richard, Udston, Hamilton
 1869 Dykes, J., jun., 92 St Vincent Street, Glasgow
 1887 Dykes, Thomas, Bent, Lesmahagow
 1887 Elliot, William, Auction Mart, Lanark
 1884 Ferguson, Alex., 300 Duke St., Glasgow
 1884 Findlay, John, Springhill, Baillieston
 1888 Findlay, John, Warrenhill, Thankerton
 1885 Findlay, Rob., of Springhill, Baillieston
 1891 Fleming, Alex., Raith, Bothwell
 1882 Fleming, Andrew, Calla, Carnwath
 1897 Fleming, David, Avonmull, Hamilton
 1888 Fleming, David, Castleton, Rutherglen
 1882 Fleming, James, Muirside, Carmunnock
 1877 Fleming, John, Ploughland, Strathaven
 1870 Fleming, J., Meadowbank Cot., Strathaven
 1876 Fleming, J. B., of Beaconsfield, Glasgow
 1882 Fleming, Wm., Windlaw, Carmunnock
 1867 Forrest, J. C., of Auchanraith, Hamilton
 1868 Forrest, Peter, of Halmayres, Shotts
 1888 Fowler, John, 4 Kelvinbank Ter., Sandyford, Glasgow
 1877 French, James, Mountherrick, Abington
 1867 Frew, Thos., 6 Windsor Terrace, Glasgow
 1868 Gairdner, Chas., Union Bank, Glasgow
 1872 Galbraith, W. W., Croftfoot, Gartcosh
 1888 Garraway, Wm., 694 Duke St., Glasgow
 1875 Gemmell, John, Glespinside, Douglas
 1878 Gibb, John, Tarbrax, Carnwath
 1891 Gilchrist, John, Orbiston Mains, Bells-hill, Glasgow
 1884 Gillespie, Wm., Gateside, Douglas
 1877 Gillies, Wm., Shawlands House, Glasgow
 1840 Gilmour, Allan, of Eaglesham, Glasgow
 1888 Gilmour, Allan, yr. of Eaglesham, Glasgow
 1882 Gilmour, Arthur, Crosshill, East Kilbride
 1877 Goff, Dr Bruce, The Lindeus, Bothwell
 1887 Goodwin, John, Clydeview, Motherwell
 1882 Graham, Thomas, 40 St Enoch Square, Glasgow
 1878 Grahame, Jas., Western Club, Glasgow
 1887 Grant, Henry O. Ogilvie, 53 Miller St., Glasgow
 1876 Gray, John, 181 Renfrew Street, Glasgow
 1867 Greenshields, J., West Town, Lesmahagow
 1868 Guild, James Wylie, C.A., Glasgow
 1884 Haddow, Robt., Cold Chapel, Abington

Admitted

1875 Hamilton, Gavin, of Auldtown, Lesmahagow
 1889 Hamilton, Gavin, jun., B. L. Co. Bank, Lesmahagow
 1869 Hamilton, James, Woolfords, Carnwath
 1867 Hamilton, of Dalzell, Lord, Dalzell, Motherwell
 1877 Hamilton, Thomas, Poniel, Douglas
 1888 Hamilton, William, High Motherwell, Motherwell
 1889 Hardie, David, Sub-Factor, Dalzell, Motherwell
 1852 Harvie, Rev. W., of Brownlee, Carluke
 1862 Hendrie, John, 74 Bath Street, Glasgow
 1868 Houldsworth, Jas., of Coltness, Wishaw
 1872 Houldsworth, W. J., Coltness House, Wishaw
 1862 Hozier, Sir W. W., of Newlands and Maidslie Castle, Bart., Carluke
 1869 Hunter, William, Craighead, Abington
 1873 Inrie, John L., Blackhill, Maryhill
 1878 Inch, John, Howburn, Walston, Biggar
 1870 Inch, Thomas, Gilerscleuch, Abington
 1884 Inglis, Dav., 145 St Vincent St., Glasgow
 1855 Jack, Robt., Bunker, Motherwell
 1867 Jeffray, John, Cardowan House, Millerston
 1893 Johnston, George, Mosesfield, Springfield
 1876 Johnston, James, Pather Farm, Wishaw
 1878 Johnston, Jas., Lochburnie, Maryhill
 1888 Kennedy, Hugh, Contractor, Partick
 1888 Kerr, James, New Mains, Douglas
 1875 Kidston, Richard, 81 Great Clyde Street, Glasgow
 1869 King, Robert, Levernholm, Hurler
 1891 Laidlaw, John, 98 Dundas Street, S.S., Glasgow
 1882 Lamberton, Andrew, Sunnyside Works, Coatbridge
 1884 LAMINGTON, Lord, Lamington House
 1881 Lang, Hugh, 11 Kew Terrace, Hillhead, Glasgow
 1864 Latta, M. R., Carmyle, Tollcross, Glasgow
 1878 Lindsay, Hugh, Meadowflat, Thankerton
 1872 LOCKHART, Sir S. M., of Lee and Carnwath, Bart., Lanark
 1884 Lockhart, Major-General Graeme, of Castlehill, C.B., Cambusnethan House, Wishaw
 1870 Lockhart, Wm. Elliott of Cleghorn, Lanark
 1867 Logan, Andrew, 1 Hampdon Terrace, Mount Florida, Glasgow
 1874 Love, Jas., 12 St James Street, Paisley Road, Glasgow
 1848 M'Call, Prof. J., Veterinary College, Glasgow
 1846 M'Call, Henry, of Daldowie, Glasgow
 1860 Macfarlane, Donald, Balmuldy, Bishopbriggs
 1884 M'Farlane, John, 151 North St., Glasgow
 1875 MacGregor, G. Sheriff, 5 Huntly Gardens, Glasgow
 1872 M'Ilwraith, Jas., 92 Regent St., Glasgow
 1863 Mackenzie, J. M., Garrison Tower, Wishaw
 1864 Mackie, J. L., Ravelston, Great Western Road, Glasgow
 1874 Mackirdy, General Elliot, of Birkwood, Lesmahagow
 1876 MacLae, A. Crum, of Cathkin, 149 St Vincent Street, Glasgow
 1871 M'Laren, James, 182 Hope Street, Glasgow
 1888 MacLellan, Robert, Conservative Club, Glasgow
 1888 M'Lennan, Bailie James, 40 St Andrew Street, Glasgow
 1882 M'Neillage, A., 46 Gordon St., Glasgow
 1875 M'Pherson, D., 95 Finlay Drive, Dennistoun, Glasgow

Admitted

- 1856 Macpherson, J., Blantyre Farm, Glasgow
 1882 M'Queen, David, Factor, Wishaw
 1884 M'Queen, Hope, Midlock, Abington
 1884 M'William, Andrew, 38 Queen Street, Glasgow
 1874 Main, Jas. A. R. (A. & J. Main & Co.), Gordon Street, Glasgow
 1879 Main, R. R. (A. & J. Main & Co.), Possil Park, Glasgow
 1889 Marshall, James, Airbles, Motherwell
 1880 Marshall, John, Sandyford, Holytown
 1877 Martin, E., 11 Kew Terrace, Kelvininside, Glasgow
 1870 Merricks, William, 166 Buchanan St., Glasgow
 1884 Millar, John, 16 St Vincent Place, Glasgow
 1892 Millar, John, Fern Hill, Cathkin, Rutherglen
 1868 Miller, G. J., of Frankfield, Shettleston
 1885 Mitchell, James, Auchengray House, Airdrie
 1888 Mitchell, Robt., M.R.C.V.S., 18 Shaftesbury Street, Glasgow
 1889 Mitchell, William, Hazleside, Douglas
 1861 Moffat, George, Strathconnan, Shettleston, Glasgow
 1875 Morton, J., Nether Abington, Abington
 1869 Mosman, H., of Auchtyfardie, Lesmahagow
 1874 Muirhead, William, Winton Place, Uddingston
 1875 Murdoch, Alex., Gartcraig, Shettleston
 1883 Murdoch, James, jun., Gartcraig, Shettleston
 1874 Murdoch, J. F., East Hallside, Newton
 1875 Murdoch, John, Carnlyne, Shettleston
 1857 Murdoch, Robert, Hallside, Cambuslang
 1862 Murray, John L., of Heavyside, Biggar
 1884 Murray, John, Parkhall, Douglas
 1874 Murray, Robert G., of Spittal, Biggar
 1879 Murray, W. G. G., 63 Hope Street, Glasgow
 1875 Napier, John S., of Lethame, Strathaven
 1867 Neilson, William, Bank of Scotland, Bellshill
 1887 Nimmo, Thomas, Lawhead, Forth
 1881 Park, James, Dechnott, Cambuslang
 1877 Paterson, G. R., Drumalbin, Thankerton
 1884 Paterson, James, jun., Over Abington, Abington
 1860 Paterson, James, of Carmacoup, Douglas
 1863 Paterson, John, Nether Howcleugh, Moffat
 1887 Paterson, John, of Torfoot, Strathaven
 1848 Paterson, Robert, of Birthwood, Biggar
 1884 Paterson, Wm., Grange, Thankerton
 1885 Paton, James, Glencaple, Abington
 1878 Payne, James, Athenæum, St George's Place, Glasgow
 1854 Pearson, Andrew A., of Springfield, Carlisle
 1869 Penier, J., Springhill, Stane, Shotts
 1889 Pollock, James, V.S., Hamilton
 1884 Pollock, W., Yoker Mains, Glasgow
 1884 Pringle, John, Castle Mains, Douglas
 1892 Ralston, Chas. W., Garscube, Maryhill
 1890 Ramsay, Professor G. G., University, Glasgow
 1892 Rattray, Patrick, C.A., 88 St Vincent St., Glasgow
 1867 Reid, F. R., of Gallowflat, Rutherglen
 1879 Reid, F. R., jun., Gallowflat, Rutherglen
 1885 Reid, William, 140 St Vincent Street, Glasgow
 1882 Rennie, David, 72 M'Alpine Street, Glasgow
 1892 Kenwick, Robert, Buchley, Cadder
 1874 Richardson, George, Western Club, Glasgow

Admitted

- 1867 Ritchie, John, Whitecastle, Biggar
 1882 Robb, Geo., 11 Gernistoun Street, Glasgow
 1882 Rodger, Hugh, Estates Office, Airdrie
 1884 Ross, John M., 2 Devonshire Gardens, Kelvininside, Glasgow
 1877 Russell, George, Carnwath
 1875 Russell, James, National Bank, Airdrie
 1882 Russell, James, Allanton, Hamilton
 1871 Salmond, David S., 40 St Enoch Square, Glasgow
 1875 Sanderson, James, West Yard Houses, Carnwath
 1884 Sandilands, R., South Cumberhead, Lesmahagow
 1868 Scott, James, Bogton, Bishopbriggs
 1878 Scott, Jas., Distiller, Garrison Tower, Wishaw
 1868 Scott, J., Springfield House, Uddingston
 1885 Scott, John, of Auchinloch, Lanzie
 1868 Scott, M., Bogton, Bishopbriggs
 1875 Scott, William, Priestfield, Blantyre
 1882 Shirlaw, James, Carfin, Motherwell
 1889 Shirlaw, John, Howgate, Carlisle
 1877 Skead, George, Royal Bank, Wishaw
 1889 Smellie, James, Coursington, Motherwell
 1856 Smith, Andrew, Milnwood, Lanark
 1876 Smith, C., 36 Howard Street, Glasgow
 1862 Smith, George, 5 Langside Terrace, Shawlands, Glasgow
 1857 Smith, H., 9 Kelvininside Terrace (North), Glasgow
 1867 Somerville, G. F., Muirhouse, Carnwath
 1881 Somerville, William, of Cormiston, B.Sc., Professor of Agriculture and Forestry, Durham College, Newcastle—Free Life Member, 1887
 1886 Speir, John, Newton Farm, Newton, Glasgow
 1838 Speirs, Thomas D., Western Club, Glasgow
 1875 Spencer, A., 180 Hope Street, Glasgow
 1888 Sprot, Major A., of Garnkirk, Chryston, Glasgow
 1883 Stalker, Donald, Mossend Farm, Mossend, Glasgow
 1861 Stark, W., 138 Watt Street, Glasgow
 1880 Steel, John, Lochwood, Gartcosh
 1891 Steel, Matthew Taylor, 135 Buchanan Street, Glasgow
 1891 Stein, A. H., of Kirkfield, Lanark
 1872 Stevenson, Wm., Lochgrog, Bishopbriggs
 1869 Stewart, D. W., Cartland, Lanark
 1854 Stewart, John, Cattle Market, Glasgow
 1879 Stewart, John, Mossvale House, Chryston, Glasgow
 1881 Stewart, R. K., of Murdostoun, Newmains
 1855 Stodart, David, Banker, Lanark
 1889 Stuart, Col. Harington, of Torrance, East Kilbride
 1892 Swan, James G., 74 Bath Street, Glasgow
 1881 Tervit, John, Boat, Thankerton
 1889 Thomson, A. J., of Huntfield, Biggar
 1869 Thomson, John, 41 Mitchell Street, Glasgow
 1882 Thomson, Seton (Rose, Murison, & Thomson), St Vincent Place, Glasgow
 1883 Thomson, S. M., Merchant, Lanark
 1892 Thomson, Seton M., Golfhill, Glasgow
 1884 Thomson, Wm., Smith Street, Kinning Park, Glasgow
 1875 Thomson, W. G., 41 Mitchell Street, Glasgow
 1877 Thorburn, Robert, Stonehill, Thankerton
 1867 Turnbull, Gregor, Merchant, Glasgow
 1882 Ure, John, 66 Washington Street, Glasgow

Admitted

- 1882 Vere, J. C. Hope, of Blackwood, Lesmahagow
 1874 Waddell, J., Airdriehill, New Monkland
 1884 Walker, William, 287 West Regent Street, Glasgow
 1882 Wallace, Hugh, 30 Havelock Street, Glasgow
 1888 Wallace, John, 273 Argyle Street, Glasgow
 1882 Wallace, John, The Ingle, Rutherglen
 1879 Wallace, W. (John Wallace & Sons), Graham Square, Glasgow
 1882 Warnock, A., Bearyards, Bishopbriggs
 1882 Watson, Adam, Oggs Castle, Newbigging Lanark
 1888 Watson, G. M., Baillaws, Lamington
 1888 Watson, John, 205 West George Street, Glasgow
 1887 Watson, John, of Earnock, Hamilton
 1884 Watson, Robert, Culterallers, Biggar
 1880 Watt, John, Drumgray, Airdrie
 1876 Watt, Robert, Solicitor, Airdrie
 1877 Weir, James, Sandilands, Lanark
 1884 Weir, W. C., 10 Princes Terrace, Glasgow
 1878 Williams, Robert, The Green, Wishaw
 1884 Williamson, Alex., Chesterhall, Wiston, Biggar
 1888 Wilson, Andrew, Dalzell, Motherwell
 1888 Wilson, James, Westburn, Camlusklang
 1889 Wilson, John, West Netherton, East Kilbride
 1879 Wilson, W., Water Meetings, Abington
 1877 Wingate, Andrew, Castlehill, Wishaw
 1889 Wood, Alex., 8 & 10 Stockwell Street, Glasgow
 1877 Wrang, Charles, 4 Stockwell Street, Glasgow
 1873 Young, Wm., Waterbank, Carmunnock
 1870 Yull, Archibald, Netherside, Strathaven

RENFREW.

- 1887 Alexander, P. D., Bridge of Weir
 1884 Allan, David, M.R.C.V.S., Clarkston, Busby
 1888 Anderson, A. D., Newbank, Giffnock
 1880 Bartlemore, William, Solicitor, Paisley
 1886 Blair, James, Bankfoot, Inverkip
 1843†BLANTYRE, Lord, Erskine, Glasgow
 1867 BLYTHWOOD, Lord, Blythwood, Renfrew
 1882 Bowie, William, Blackbyres, Barrhead
 1884 Bryce, David, Abbots Inch, Paisley
 1885 Burns, Sir John, of Castle Wemyss, Bart., Wemyss Bay
 1884 Clark, James, Burnside, Mearns
 1884 Clark, Wm., Netherlea Farm, Cathcart
 1888 Coats, Thos. Glen, of Ferguslie Park, Paisley
 1882 COCHRANE, The Hon. Thomas, Dankeith, Kilmarnock
 1860 Colquhoun, J., Corkerhill, Pollokshaws
 1884 Crawford, John W., Greenock
 1878 Cross, Alex., jun., Eastbank, Langbank
 1881 Cross, David, Eastbank House, Langbank
 1865 Crum, Alex., of Thornliebank, Glasgow

Admitted

- 1880 Cuninghame, J. C., of Craigends, Johnstone
 1882 Ferguson, A. R., Writer, Neilston
 1876 Ferguson, Peter, Rock Cottage, Renfrew
 1888 Fleming, Wm., Fulwood Mains, Linwood
 1867 Gilmour, Matt., Town of Inchinnan, Paisley
 1867 Glegg, J., Factor, Milliken House, Johnstone
 1888 Gordon, John, of Aikenhead, Cathcart
 1877 Herron, W., Town-Clerk, Renfrew
 1876 Houstoun, Geo. L., of Johnstone, Johnstone
 1879 Howie, William, Finnochbog, Inverkip
 1867 Hunter, Jas., Braehead House, Cathcart
 1884 Jackson, Jas., Carolside, Busby
 1876 Jameson, Wm., Tighnamara, Wemyss Bay
 1889 King, Robert A., Fulwood, Linwood
 1876 Lang, Alex., Garneyland, Paisley
 1882 Locke, Mathew, Arthurlie, Barrhead
 1876 Love, Alex., Margaret's Mill, Kilmacolm
 1876 Macdowall, H., of Garthland, Lochwinnoch
 1884 M'Kie, H. B., Freeland, Erskine
 1876 M'Lachlan, Colin, Drums, Greenock
 1886 Mactavish, D. A., Solicitor, Johnstone
 1878 Mather, William, Kirkhill, Newton Mearns
 1884 M'William, John, Fairfield, Paisley
 1889 MAXWELL, Sir John Maxwell Stirling, of Pollok, Bart., Pollokshaws
 1884 Myles, James, Deanside, Renfrew
 1880 Orr, Robert Risk, Lochwinnoch
 1881 Park, Walter, Hatton, Bishopton, Erskine
 1888 Paterson, Jas., 32 Eldon Street, Greenock
 1867 Peile, H. R. B., Mansion House, Greenock
 1882 Pollock, John, Pollokshaws
 1878 Pollok, John, of Blackhouse, Mearns
 1888 Pottie, Alexander, V.S., Paisley
 1876 Ramsay, John, Butcher, Kilbarchan
 1869 Rannie, M. G., Heathbank Villa, Hunters Quay, Greenock
 1888 Reid, Colin, Castle Farm, Mearns
 1882 Reid, Robert, Writer, Lochwinnoch
 1888 Reid, William, Titwood Farm, Mearns
 1888 Richardson, David, of Hartfield, Greenock
 1868 Riddell, David, Blackhall, Paisley
 1880 Scott, A., 24 Mearns Street, Greenock
 1882 Scott, James B., Ryeraes, Linwood
 1891 Speirs, Alex., Archibald, of Elderslie, Houston House, Johnstone
 1848†STEWART, Sir M. R. Shaw, of Greenock and Blackhall, Bart., Ardgowan, Greenock
 1876 Stodart, G., Netherton, Newton Mearns
 1880 Taylor, William, Park Mains, Renfrew
 1892 Tough, Alex., Clyde Rope Work, Greenock
 1888 Wallace, John, Broadlee, Neilston
 1888 Wilson, John, Erskine, Bishopton
 1888 Wilson, Robert, Manswrae, Bridge of Weir
 1888 Young, Alex., Castlehill Farm, Eaglesham
 1888 Young, R. C., Netherfield, Paisley

2.—PERTH DISTRICT.

EMBRACING THE

COUNTIES OF FIFE, FORFAR (WESTERN DIVISION), KINROSS,
AND PERTH (EASTERN DIVISION).

FIFE.

Admitted
1861 Aitken, George, Tyrie, Kirkcaldy
1883 Aitken, George Lewis, Boglilly, Kirkcaldy
1888 Allan, James, Dysart
1875 Anderson, Charles, Pettykil, Leslie
1877 Anderson, David, Cassendilly, Cupar-Fife
1867 Anderson, W. H., Anchor Lodge, Anstruther
1892 ANSTRUTHER, Sir R., of Balcaskie, Bart., Pittenweem
1862 Arnot, David, Friarton, Newport, Fife
1886 Arnot, Thomas, Newton of Falkland, Falkland
1884 Auchterlonie, Alex., Hayston, Leuchars
1884 Auchterlonie, James, Dothan, Kirkcaldy
1844 Aytoun, R. S., of Inchdairnie, Kirkcaldy
1873 Baird, William, of Elie, Fife
1884 Balfour, Edward, yr. of Balbirnie, Markinch
1857 Balfour, Major F. W., of Fernie Castle, Collesie
1890 Balfour, Francis, yr. of Fernie, Fernie Castle, Collesie
1839 Balfour, John, of Balbirnie, Markinch
1871 Ballingal, Neil, Sweetbank, Markinch
1861 Ballingal, John, Dunbog, Newburgh
1890 Banks, James, Fitteddie, Kinghorn
1886 Baxter, Edward Gorrel, of Teasses, Largo
1891 Baxter, John Henry, of Gilston, Largo
1856 Bell, David, Todhall, Cupar-Fife
1879 Bell, Dr James M., Kettle
1880 Bell, John, Stenton, St Monance
1890 Bell, Thomas, Todhall, Cupar-Fife
1835 Bell, T., Craigkennoch Terrace, Burntisland
1877 Bennett, Arthur, South Pitkinnie, Lochgelly
1861 Berwick, David, Ardross, Elie
1848 Bethune, Alexander, Elie
1833 Bethune, Colonel R., of Nydie, St Andrews
1862 Beveridge, George, Kirkcaldy
1869 Beveridge, Jas., Crombie, Dunfermline
1872 Beveridge, William, of Bonnyton, Dunfermline
1881 Beveridge, William, jun., Eastgrange, Dunfermline
1879 Bisset, Alex., Balfarg, Markinch
1833 Black, James, Tullybreck, Markinch
1890 Black, John, Nether Fratis, Leven
1889 Blyth, James, jun., Logie, Cupar-Fife
1890 Blyth, William, Easter Kincape, St Andrews
1879 Bonthorne, A., Newton of Falkland, Falkland
1887 Bowman, George M., of Logie, Cupar-Fife

Admitted

1859 Bowman, James, Newark, St Monance
1890 Braid, John, Abercrombie, St Monance
1885 Briggs, Major-General, of Strathairly, Largo
1891 Brown, Andrew, Rossie, Collesie
1876 Brown, John, of Colton, Dunfermline
1875 Bruce, Hon. R. P., Broomhall, Dunfermline
1842 Bruce, John, W.S., 8 Pilmuir Links, St Andrews
1884 Buchan, Thomas, Balhousie, Largo
1890 Burton, George W., Shiels, Collesie
1889 Buttercase, Andrew, Uthrogie, Cupar-Fife
1880 Carnegie, James, of Aytoun Hill, Newburgh
1809 Carswell, David, of Rathillet, Cupar-Fife
1885 Carswell, J. H., Straiton, Leuchars
1868 Cartwright, T. R. B. Leslie Melville, Melville House, Ladybank
1886 Cathcart, James T., yr. of Pitcairrie, Newburgh
1857 Cathcart, R., of Pitcairrie, Newburgh
1883 Cheape, Captain G. C., of Wellfield, Strathmiglo
1830 Cheape, Mrs. of Wellfield, Strathmiglo
1881 Cheape, J., of Lathockar, St Andrews
1879 Christie, F. W., Dairsie Mains, Cupar-Fife
1890 Christie, James M., ScotsCraig, Tayport
1874 Christie, John, Kirktonbarns, Tayport
1880 Clark, Alex., Balmullo, Leuchars
1870 Cleghorn, Dr, of Stravithy, St Andrews
1892 Constable, George William, of Glencraig, Lochgelly
1890 Constable, John, M.D., Leuchars
1800 Craig, James, Urquhart, Dunfermline
1878 Craig, John, Craigencaif, Kinghorn
1806 Crawford, R., Crooks House, Inverkeithing
1879 Cunningham, David, Dalachy, Burntisland
1879 Cunningham, John, Burntisland
1883 Cunningham, T. D., The Mount, Cupar
1880 Carr, James, Knockhill, Newport, Fife
1881 Curror, Peter, Maltster, Kirkcaldy
1880 Davidson, George P., Kirkbank, Burntisland
1851 Dingwall, William, Ramornie, Ladybank
1873 Drummond, J., jun., Blacklaw, Dunfermline
1869 Dryburgh, J., Kininmonth, Cupar-Fife
1861 Drysdale, Wm., of Kirrie, Kinghorn
1884 Dun, George, Easter Kincape, St Andrews
1890 Duncan, Mrs Morison, of Naughton, Newport

Admitted

1888 Duncan, Miss C. H. A. Morison, of Naughton, Newport
 1883 Duncan, John, Kirkmay, Crail
 1871 Duncan, John, yr. of Kinkell, St Andrews
 1882 Duncan, John W., Boghall, Kingsbarns
 1855 Duncan, Robert, of Kirkmay, Crail
 1885 Duncan, Thomas L., Pusk, Leuchars
 1881 Elder, Hugh, Dunfermline
 1875[†] ELGIN and KINCARDINE, the Earl of, Broomhall, Dunfermline
 1867 ELPHINSTONE, Hon. Edward B. C. B., Comrie Castle, Dunfermline
 1860 ERSKINE, Sir Thomas, of Cambo, Bart., Crail
 1892 Fair, Alex., Shawsmill, Cardenden
 1890 Fairbairn, W. D., M.R.C.V.S., Cupar-Fife
 1891 Fairlie, J. O. R., of Myres Castle, Auchtermuchty
 1890 Farmer, A. Douglas, Kinkell, St Andrews
 1884 Farmer, A. F., of Brownhills, St Andrews
 1884 Farmer, Robert, of Kingask, St Andrews
 1882 Ferguson, R. C. Munro, of Raith, M.P., Kirkcaldy
 1891 Ferrie, David, Farbroath, Cupar-Fife
 1892 Finlay, Archibald, Markinch
 1859 Finlay, John, Lochend, Lochgelly
 1861 Flockhart, J., Banker, Colinsburgh
 1878 Forgan, James, Sunnybraes, Largo
 1857 Fortune, George, Barnsmuir, Crail
 1871 Foulis, Dr R., of Cairney Lodge, Cupar-Fife
 1861 Fyfe, Robert, Wester Nethier Urquhart, Gateside, Fife
 1879 Fyshe, Jas., jun., Treaton, Markinch
 1888 Galloway, John, Milton, Leuchars
 1871 Gibb, David, Balmonth, Pittenweem
 1892 Gibson, A. H., Kirkcaldy—*Free Life Member*
 1877 Gibson, James, Aithernie, Leven
 1877 Gilchrist, Andrew, Carvenom, Anstruther
 1871 Gillespie, Alex., Balmeadowside, Cupar-Fife
 1841 Gillespie, D., of Mountquhannie, Cupar-Fife
 1872 Gilmour, John, of Montrave, Leven
 1887 Goodall, Thos., Cardenburns, Cardenden
 1888 Gourlay, J. Murray, 1 Hope St., St Andrews
 1887 Grace, Stuart, St Andrews
 1885 Gray, T. M., Barony Cottage, Cupar-Fife
 1892 Greig, Robert Blyth, Balcurvie, Windygates—*Free Life Member*
 1869 Haig, H. V., Ramornie, Ladybank
 1881 Hamilton, Jas. A., West Muircambus, Kilconquhar
 1871 Haggie, R. B., West End House, Kirkcaldy
 1891 Henderson, A. L., Kingsdale, Kennoway
 1884 Hepburn, James, Forth Bank, Kinghorn
 1877 Hepburn, John, Kinghorn
 1876 Herdman, B. A., Falkland Wood, Falkland
 1872 Hill, David, Upper Magus, St Andrews
 1881 Hill, John, Langside, Kennoway
 1884 Husband, D., Struthers, Cupar-Fife
 1891 Husband, Robt., Solicitor, Dunfermline
 1888 Hutchison, Alex., Ingleside, Kirkcaldy
 1891 Hutton, John, Wall Park, West Anstruther
 1891 Inglis, James, Redhouse, Cardenden, R.S.O.
 1887 Inglis, John, Colluthie, Cupar-Fife
 1887 Inglis, R. T., Blinkbonny Lodge, Newburgh

Admitted

1869 Irvine, Walter, of Grangemuir, Pittenweem
 1876 Jamieson, W. T., Solicitor, Anstruther
 1890 Johnston, John, New Inn, St Andrews
 1882 Johnston, S. W., Fincraigs, Newport
 1874 Johnstone, W. M., Banker, Cupar-Fife
 1890 Kay, Alex., Flass, Newport
 1805 Kidd, A. F., High St., West Aberdeen
 1859 Kinmonth, Peter, Collairnie, Newburgh, Fife
 1884 Kinnear, John Boyd, of Kinloch, Collesie
 1871 Kinross, Thomas, Balbeggie, Dysart, Fife
 1879 Knight, Robert, jun., V.S., Dunfermline
 1877 Landale, Jas., Woodmill, Auchtermuchty
 1874 Landale, John, of Woodbank, Dunfermline
 1859 Lauder, Dewar, South St., St Andrews
 1891 Lawson, Alex., yr. of Burnturk, Annfield, Kettle
 1890 Lawson, Henry Graham, Causewayhead, Newport
 1867 Lawson, Thos., of Carriston, Markinch
 1863 Lee, John, East Coates, Largo
 1884 Lees, David, Pittscottie, Cupar
 1802 LESSLIE, Hon. G. Waldegrave, Leslie House, Leslie
 1885 LINDSAY, The Earl of, Kilconquhar House
 1889 Lochhead, Matthew, Wester Balgarvie, Cupar-Fife
 1854 Macdonald, Alex., of Edenwood, Cupar-Fife
 1869 M'Farlane, James, Writer, Dunfermline
 1890 M'Gibbon, John, Bankhead, Leven
 1890 M'Gregor, Donald, Broomhall Estate Office, Charlestown
 1890 M'Gregor, James Fleming, 71 Market Street, St Andrews
 1878 M'Intosh, Dr, University, St Andrews
 1871 Maitland, Henry, Balmungo, St Andrews
 1879 Marshall, Walter, of Lochmaloney, Cupar
 1879 Martin, James, Priestfield, Pittleslie, Ladybank
 1880 Meldrum, D. B., of Kincaele, St Andrews
 1859 Meldrum, J., of Eden Bank, Pittormie, Cupar-Fife
 1869 Melville, J. M. Balfour, Mount Melville, St Andrews
 1875 Menzies, Fergus, Blackhall, Dunfermline
 1877 Millar, J., of Waukmill, Dunfermline
 1890 Miller, James Gilbert, Starr, Cupar-Fife
 1870 Millie, George, St Mary's, Cupar-Fife
 1883 Mitchell, Alex., Finmonth, Kinglassie
 1857 Mitchell, Alex., Luscar, Dunfermline
 1861 Mitchell, John, Fliskmill, Cupar-Fife
 1872 Mitchell, John, Newbigging, Burntisland
 1859 Mitchell, Robert, 3 Bonnygate, Cupar-Fife
 1878 Morrison, B. G. W., of Falfield, Cupar-Fife
 1800 Morton, David, Craighead, Crail
 1879 Muckersie, Henry, Drumsin, Dunfermline
 1890 Mudie, T. E., Greenside, Largo
 1875 Muirhead, T., Townhill Store, Dunfermline
 1888 Nairn, M. B., of Rankellour, Cupar
 1884 Nisbet, T. M., Forthar, Kettle
 1880 Norman, William J., Dysart
 1873 Oliphant, T. T., Queen Mary's, St Andrews
 1892 Orchison, Alex., of Torr, Cupar-Fife
 1882 Osborne, David, Banker, Cupar-Fife
 1848 Oswald, J. T., of Dunnikier, Kirkcaldy
 1886 Page, Walter, Bogleys, Kirkcaldy
 1859 Paton, John, Kirkness, Lochgelly

Admitted

- 1873 Pitblado, C. B., Mavisbank, Oakley, Dunfermline
 1864 Prentice, G., of Strathore, Thornton
 1889 Purvis, Major A. B., R.A., Kinaldy, Stravithy, R.S.O.
 1844 Purvis, John, of Kinaldy, Stravithy, R.S.O.
 1864 Reekie, A., Walton, Auchtermuchty
 1880 Reid, Andrew, V.S., Auchtermuchty
 1882 Reid, John, of Dunduff, Dunfermline
 1878 Rigg, James Home, of Tarvit, Cupar-Fife
 1861 Rintoul, D., Mains of Blebo, Cupar-Fife
 1873 Roberts, J., Greenhead of Arnot, Leslie
 1860 Robertson, Dr Charles, 16 Craigholm, Burntisland
 1882 Robertson, Donald, of Mayfield, Cupar-Fife
 1859 Robertson, J., Denbrae, Cupar-Fife
 1891 Ross, Nicol, Cattle-salesman, Dunfermline
 1892 Rosslyn, The Earl of, Dysart House, Kirkcaldy
 1859 Russell, David, Silverburn, Leven
 1882 Russell, George, Hatton, Largo
 1869 Russell, James, of Kinsleith, Cupar-Fife
 1843 Scott, James Addison, 3 Kinburn Terrace, St Andrews
 1888 Sheppard, Thomas, Moonzie, Cupar
 1879 Sime, Alex., Dumbarnie, Largo
 1880 Simpson, John, Burntisland
 1857 Small, L., of Foodie, Cupar
 1886 Smith, Andrew, Hilltarvit, Cupar-Fife
 1882 Smith, James T., Duloch, Inverkeithing
 1890 Smith, John H., Kingskettle
 1886 Smith, Thomas, Inverdot, Newport
 1878 Smith, Wm., Balbougie, Inverkeithing
 1845 Spears, W. R., Writer, Kirkcaldy
 1870 Stark, Robert, Kirkcaldy
 1876 Stenhouse, J. S., of Northfod, Dunfermline
 1882 Stevenson, John, Lillyhill House, Dunfermline
 1877 Stewart, Duncan, The Grange of Lindores, Newburgh
 1892 Stewart, Hugh, Lumphinnans, Cowdenbeath
 1890 Storrar, David, Land Surveyor, Cupar-Fife
 1891 Storrar, Richard, Pyestone, Markinch
 1889 Syme, John, Nether Strathkinness, St Andrews
 1857 Syme, William, Craigie, Leuchars
 1871 Thom, James, of Leden Urquhart, Gateside, Fife
 1875 Thom, James F., Wellsgreen, Windygates
 1891 Thom, James H., Coates, Largo
 1870 Thom, R. D., Pitlochrie, Strathmiglo
 1891 Thomson, Henry, Perceval, Buckhaven
 1848 Thomson, Colonel John A., of Charleton, Colinsburgh
 1877 Tod, James, Easter Cash, Strathmiglo
 1875 Troup, Alexander, Strathmiglo
 1873 Tulloch, James, Dales, Inverkeithing
 1867 Veitch, Walter, Grange, Kinghorn
 1878 Walker, Archibald, Banker, Auchtermuchty
 1892 Walker, James L., Banker, Auchtermuchty
 1890 Walker, Peter C., Kilmaron, Cupar-Fife
 1875 Walker, Thos., Dempston, Auchtermuchty
 1882 Wallace, George, Lebanon House, Cupar-Fife
 1861 Wallace, James, Brake, St Andrews
 1891 Wallace, John, Duniface, Leven
 1880 Wallace, T. A., Banker, Burntisland
 1875 Wallace, Wm., Kincaid, Guardbridge
 1891 Walls, Donald M., Grain Merchant, Dunfermline

Admitted

- 1883 Walls, Robert, Grange, Burntisland
 1892 Wardlaw, John, Tough Mill, Dunfermline
 1873 Watt, Alex., Balharton, Kirkcaldy
 1871 Watt, George, Kilmay, Cupar-Fife
 1882 Watt, W., Seed Merchant, Cupar-Fife
 1890 Webster, Thomas, Nisbetfield, Ladybank
 1874 Wedderburn, H. S., of Wedderburn, Birkhill, Cupar
 1884 Weighton, J. G., of Priorletham, St Andrews
 1889 Wemyss, Alex. Watson, Denbrae, St Andrews
 1880 Wemyss, D. W., 9 North Bell Street, St Andrews
 1872 Wemyss, R. G. E., of Wemyss, Kirkcaldy
 1875 Whyte, John, Lundin Mill, Largo
 1857 Wilkie, George, Cowdenlaws, Dysart
 1892 Wilson, Daniel, Reedieles, Auchtermuchty
 1882 Wilson, Geo., Gladstone Cottage, Cupar
 1880 Wilson, P., Seed-crusher, Burntisland
 1882 Wilson, Robt. M., Brucefield, Dunfermline
 1877 Wood, Major William, Falkland
 1878 Wyatt, S., Post Office, Cupar-Fife
 1859 Young, A., Lochtyside, Thornton, Kirkcaldy
 1875 Younger, J. B. B. C., North Callange, Cupar

FORFAR

(WESTERN DIVISION).

- 1881 Adams, Dr James, Oathlaw, Forfar
 1882 Airlie, The Earl of, Cortachy Castle
 1881 Alexander, John, Ballindarg, Kirriemuir
 1890 Andrew, James M., Magdalen, Kirkcaldy, Dundee
 1853 Arklay, John, Seafield, Broughty Ferry
 1868 Arklay, Robert, of Ethiebeaton, Dundee
 1871 Arnot, Wm., Glamis Mains, Glamis
 1886 Ballingal, Hugh, Ardarroch, Dundee
 1889 Batchelor, Francis M., Craig, Dundee
 1890 Baxter, George Washington, Ashcliff, Dundee
 1879 Bell, Alexander, Kirkton of Tealing, Dundee
 1856 Bell, Thomas, Ballinshoe, Kirriemuir
 1890 Bell, Thomas, of Belmont, Dundee
 1890 Bell, William Forsyth, Barns of Olaverhouse, Dundee
 1890 Berry, James, Merchant, Dundee
 1876 Black, John, Cortachy, Kirriemuir
 1870 Bruce, Andrew, Jordanston, Meigle
 1867 Burr, Rev. P. Lorimer, Lundie Manse, Dundee
 1861 Buttar, David, Corston, Coupar-Angus
 1882 Buttar, Thomas A., Corston, Coupar-Angus—Free Life Member
 1881 Cameron, James, Murthill Farina Works, Forfar
 1871 Camperdown, The Earl of, Camperdown, Dundee
 1890 Carmichael, James, Mayfield, Dundee
 1858 Carnegie, W., yr. of Dunlappie, Coupar-Fife
 1861 Carver, John, Kinloch, Meigle
 1884 Clark, James, F.R.C.V.S., Abbeyhill, Coupar-Angus
 1893 Cowans, David S., of West Mains, Auchterhouse, Dundee
 1881 Cowpar, James, Over Migvie, Kirriemuir
 1890 Cox, Alfred W., Beechwood, Loches
 1890 Cox, Edward, of Cardean, Meigle
 1882 Cox, Geo. M., Dryburgh House, Dundee
 1890 Dewar, James C., Aldie Arms Hotel, Kirriemuir
 1881 Duke, Wm., Newbarns, Kirriemuir

Admitted

- 1888 Duncan, John, Braehead, Kirriemuir
 1879 Duncan, Patrick G., East Menus, Kirriemuir
 1887 Duncan, Wm., Welltown, Coupar-Angus
 1881 Duncan, W. G., Balkemback, Tealing, Dundee
 1887 Farquharson, Alex., Greenburn, Coupar-Angus
 1889 Farquharson, A. J. Newtyle—Free Life Member
 1879 Ferguson, Jas., Balunie, Coupar-Angus
 1843 Forrest, James, jun., Kirriemuir
 1879 Fullarton, Jas., Balgove, Coupar-Angus
 1890 Gardiner, Thomas J., Banchoy, Coupar-Angus
 1890 Gilroy, George Alex., Broughty Ferry
 1890 Gourlay, Henry, Balgay House, Dundee
 1879 Graham, D. M., Auctioneer, Forfar
 1890 Grainger, John, Pitcure, Coupar-Angus
 1890 Grant, Alex., Forfar
 1890 Grant, John, Craig Mills, Dundee
 1881 Guild, Thomas, Hardhill, Kirriemuir
 1890 Halkett, John Gilbert Hay, Balendoch, Meikle
 1870 Hanning, J. J., 81 Tait's Lane, Dundee
 1871 Harris, Wm., Innkeeper, Alyth
 1873 Henderson, G. D. C., Com. R.N., of Invergowie, Dundee
 1890 Henderson, William, Milton of Collace, Coupar-Angus
 1889 Hendry, William, Mains of Coul, Kirriemuir
 1888 Hunter, Wm., Laurel Bank, Dundee
 1882 Hutcheson, And., 10 Dudhope Place, Dundee
 1890 Jack, Henry, Menzies Hill, Dundee
 1890 Johnston, Alex., Castle of Mains, Dundee
 1890 Johnston, John, 14 St Clement's Lane, Dundee
 1890 Keller, John Mitchell, of Morven, Binnock, Dundee
 1890 Kidd, David, West Ardler, Meikle
 1829 Kinloch, Col. John Grant, of Kilrie, Logie, Kirriemuir
 1888 Kyd, Robert, Implement-maker, Coupar-Angus
 1893 Laird, W. P., 73 Nethergate, Dundee
 1890 Lyburn, John, Kinochtry, Coupar-Angus
 1870 M'Farlane, William, 177 Blackness Road, 8 Ferguson's Buildings, Dundee
 1865 M'Gavin, Robert, of Ballumbie, Dundee
 1890 MacIntyre, Peter, Denfind, Monikie, Dundee
 1890 M'Kay, Alexander, Mains of Auchterhouse, Dundee
 1890 Marshall, James Scott, Wynton Chemical Works, Dundee
 1891 Martin, Robert, Baldovie, Kirriemuir
 1890 Mathers, David, Hotel-keeper, Dundee
 1885 Menzies, W. D. Graham, Hallyburton, Coupar-Angus
 1890 Murray, J. Douglas, Viewbank, Meikle Dundee
 1891 Murray, Joseph, Dryburgh, Loches, Dundee
 1887 Myles, Rob., Collamy, Cortachy, Kirriemuir
 1897 Nicol, T. Monro, Littleton, Kirriemuir
 1891 Nicoll, William, Carsebank, Forfar
 1859 Ogilvy, John, Harecraig, Dundee
 1871 Ogilvy, Sir Reginald H. A., of Inverquhar, Bart., Baldovan House, Dundee
 1890 Pattullo, David, South Gask, Coupar-Angus
 1885 Pattullo, William, 19 St Andrew Street, Dundee
 1893 Pattullo, William, Fullarton, Meikle
 1849 Powrie, James, of Reswallie, Forfar

Admitted

- 1880 Primerose, A. G., Dock Street, Dundee
 1868 Ralston, Andrew, Glamis House, Glamis
 1876 Reid, George, Ladywell, Kirriemuir
 1873 Reid, James, Kilmundy, Glamis
 1879 Ritchie, R. B., Accountant, Dundee
 1890 Robertson, Alexander, of Burnside, Forfar
 1890 Robertson, Wm. Brown, Dudhope House, Dundee
 1893 Rogers, James S., Rose Mill, Dundee
 1881 Rogers, Wm., Ph.D., Rose Mill, Dundee
 1881 Ross, Wm., North Drumgray, Forfar
 1890 Scott, George C., The Retreat, Perth Road, Dundee
 1882 Scott, Robert, 56 Dundee Road, Forfar
 1888 Sharp, Andrew, 24 Springfield, Perth Road, Dundee
 1890 Sharp, John, jun., Balmuir House, Dundee
 1890 Shiell, John, Solicitor, Bank Street, Dundee
 1890 Short, James, Royal Hotel Stables, Dundee
 1890 Sidey, James, Newhall, Coupar-Angus
 1889 Smart, John B., Pitairie, Moniketh, Dundee
 1877 Smith, Thomas, Powrie, Dundee
 1884 Smith, Thomas, Mains of Fowles, Dundee
 1884 Smith, William, Ward Road, Dundee
 1890 Spreull, Andrew, V.S., Yeaman Shore, Dundee
 1893 Stewart, William, New Mill, Tannadice, Forfar
 1891 Strachan, James, West Pilmore, Longforgan, Dundee
 1897*† STRATHMORE, The Earl of, Glamis Castle
 1890 Tasker, George, Arbog, Meikle
 1880 Tasker, William, Camno, Meikle
 1890 Thoms, Thomas S., Benvie, Invergowie, Dundee
 1881 Turnbull, George, Baldonkie, Tannadice
 1880 Watson, Wm., Ochterlony Mains, Forfar
 1881 Wedderspoon, George, Balgavies, Forfar
 1893 White, John F., Gram Merchant, Dundee
 1891 White, J. Martin, of Balruddery, Dundee
 1861 Whittton, And., of Couston, Newtyle
 1884 Whyte, Archibald, Spott, Kirriemuir
 1870 Whyte, Archibald, jun., Nether Hayston, Forfar
 1890 Whyte, James, Upper Hayston, Glamis
 1871 Whyte, John, West Denoon, Glamis
 1868 Whyte, William, Spott, Kirriemuir
 1881 Wilkie, James, Solicitor, Kirriemuir
 1888 Willisler, George, Pitpointie, Auchterhouse, Dundee
 1878 Wilson, T. Mackay, Solicitor, Kirriemuir
 1890 Young, John, Balnyle, Meikle

KINROSS.

- 1882 ADAM, Sir Charles E., of Blairadam, Bart.
 1861 Anderson, Robert H., Tillyrie Cottage, Milnathort
 1868 Beath, David, Arlary, Milnathort
 1873 Begg, R. Burns, Sheriff-Clerk, Kinross
 1882 Beveridge, John, of Kinneston, Leslie, Fife
 1884 Bogie, Major, Bank Agent, Kinross
 1880 Ewing, Francis, Bank Agent, Milnathort
 1884 Fergusson, David, Bursleigh, Kinross
 1884 Flockhart, Wm., Annacroich, Kinross
 1884 Greig, Andrew, of Holston, Milnathort
 1883 Greig, John, of Tillyrie, Milnathort
 1885 Hepburn, John, V.S., Milnathort
 1873 Mitchell, Jas., Aldie Castle, Fossoway
 1882 Montgomery, H. Jas., of Hattonburn, Milnathort

Admitted

- 1862 Morrison, J. B. B., of Finnerlie, Kinross
 1871 Reid, George, of Tillyrie, Milnathort
 1871 Roxburgh, Robert, Seed Merchant, Kinross
 1881 Russell, T. Purves, of Warroch, Milnathort
 1890 Simpson, James, Mawcarse, Milnathort
 1878 Simpson, James, North Lethana, Kinross
 1884 Steedman, James, of Frux, Kinross
 1884 Steedman, Thos., Bank Agent, Kinross
 1873 Terris, J., jun., Dullomuir, Blair Adam
 1870 Tod, Thomas M., West Brackly, Kinross
 1884 Tod, William, of East Brackly, Kinross
 1877 Walls, James, Lochran, Kinross
 1848 Young, Harry, of Cleish Castle, Kinross
 1891 Young, Robert, Sunnyside, Kinross

PERTH

(EASTERN DIVISION).

- 1878 Allan, John, Culthill, Dunkeld
 1887 Allan, William, Kinnon Park, Methven, Perth
 1874 Anderson, Alex., Berryhill, Dundee
 1870 Anderson, Archibald Turnbull, Perth
 1873 Anderson, Dr Arthur, O.E., Sunnyside, Pitlochry
 1888 Anderson, D. A., Erioch Lodge, Blairgowrie
 1871 Anderson, John A., St Albans, Perth
 1878 Anderson, Peter, Duneaves, Fortingal
 1871 Anderson, Robert, Balbrogie, Coupar-Angus
 1890 Annand, David, Cotton of Craig, Glen Isla, Alyth
 1860*ATHOLE, The Duke of, K.T., Blair Castle, Blair Athole
 1841 ATHOLE, The Duchess Dowager of, Dunkeld
 1870 Ballingall, A. H., W.S., Perth
 1869 Bayne, Lewis, Jeanie Bank, Old Scone, Perth
 1879 Beattie, James, Rockdale Cottage, Perth
 1887 Bell, Edwin W., Rossie, Forgandenny
 1887 Bell, James H., of Rossie, Forgandenny
 1869 Bell, William, Barclayhills, Perth
 1884 Bett, Thomas, Urral, Aberfeldy
 1873 Bisset, Thomas S., Blairgowrie
 1884 Black, Captain, of Balgowan, Perth
 1879 Black, George, Victoria Street, Perth
 1883†BREADALBANE, The Marquis of, Taymouth Castle, Aberfeldy
 1888 Brewster, James, Tarrylow, Balbeggie, Perth
 1871 Brown, Peter, Milton of Luncarty, Redgorton
 1882 Buchanan, Geo., Laguna House, Murthly
 1877 Butter, Albert, Union Bank, Perth
 1871 Cairns, Robert, Bertha Park, Perth
 1889 Calder, James, of Ardgargie, Forgandenny
 1888 Cameron, Donald, Roro More, Aberfeldy
 1877 Cameron, Duncan, Kinloch Rannoch
 1892 Campbell, Alex., Borland, Fernan, Killin
 1887 Campbell, Lieut.-Col., General Frison, Perth
 1879 Campbell, Duncan, Stronach, Aberfeldy
 1846 Campbell, J. L., of Achalader, Blairgowrie
 1871 Chalmers, James, Shielhill, Stanley
 1879 Chalmers, John, Westwood, Stanley
 1890 Chisholm, Colin Edward, Grange of Elcho, Perth
 1871 Chrystal, George, Engineer, Perth
 1871 Clark, Robert, Taybank House, Errol
 1881 Cowan, Walter, Kinmonth, Bridge of Earn
 1890 Cox, Albert E., of Dungarhill, Dunkeld

Admitted

- 1883 Cox, Wm., of Snaigow, Dunkeld
 1890 Cox, William Henry, yr. of Snaigow, Dunkeld
 1860 Crawford, William, Beechwood, Perth
 1879 Dalgleish, Wm. Ogilvy, of Errol Park, Errol
 1846 Dickson, John, W.S., Greenbank, Perth
 1871 Doe, John, Errol
 1879 Dow, David, jun., Balmanno, Bridge of Earn
 1865 Duff, James, 48 Glover Street, Perth
 1878 Dunn, William, Kenmore Mains, Aberfeldy
 1874 Fell, John Duncan, Flesher, Blairgowrie
 1858 Ferguson, Thos., Kinochtry, Coupar-Angus
 1879 Ferguson, W. S., Pictstonhill, Perth
 1879 Fergusson, Donald, Dalcaupon, Ballinluig
 1861 Fisher, Donald, The Hotel, Pitlochry
 1881 Fleming, Rev. A., of Inchyra, Hamilton House, Perth
 1892 Fotheringham, Walter Stewart, of Fotheringham and Murthly
 1879 Fraser, John M., Auction Mart, Perth
 1874 Galloway, Alex., C.E., Dirgarbh, Aberfeldy
 1890 Galloway, David, Grain Merchant, Perth
 1884 Galloway, Thomas T., Cairnie, Glencarse, Perth
 1884 Gammell, Colonel J. H. H., of Lethendy, Melkior
 1871 Geekie, R., of Baldowrie, Rosemount, Blairgowrie
 1887 Gellatly, William, Balgowan, Perth
 1871 Gibson, Charles, Pitlochry
 1875 Gillespie, Jas. J., St Colmes, Ballinluig
 1878 Gold, Joseph, Murthly Farm, Perth
 1887 Gow, Geo., Dunalastair Hotel, Rannoch
 1881 Graham, A. G. Maxtone, yr. of Cultoquhey, Crieff
 1848 Graham, J. Maxtone, of Cultoquhey, Crieff
 1888 Grahame, John, Sheriff - Substitute, Murrayshall, Perth
 1887 Grant, George, Tullyneddie, Blairgowrie
 1879 Grant, John S., Tullymet, Ballinluig
 1889 Grant, Robert, Bengarth, Blairgowrie
 1879 Gray, E. A. Stuart, of Gray and Kinfauns, Perth (14 Atholl Cresc., Edinburgh)
 1880 Gray, George, of Bowerswell, Perth
 1861 Greig, T. Watson, of Glencarse, Perth
 1871 Grimond, Alex. D., of Glenelicht, Blairgowrie
 1871 Haugart, Peter, Breadalbane Mills, Aberfeldy
 1881 Hart, Andrew, Aberdalgie, Perth
 1870 Hay, Alexander, Easter Cuthmalundie, Perth
 1892 Hay, Colonel Drummond, of Seggieden, Perth
 1890 Haynes, George G., Camserney Cottage, Aberfeldy
 1871 Heiton, Andrew, Perth
 1880 Hollingworth, Alfred, Powgavie, Inchture
 1871 Hunter, Patrick, Waterybuts, Errol
 1843 Irvine, Dr Wm. S., Craigatin, Pitlochry
 1884 Jameson, Martin, Fernhill, Perth
 1882 Jameson, Melville, Solicitor, Perth
 1880 Jameson, Alexander, 81 Barossa Place, Perth
 1880 Jamieson, John, 81 Barossa Place, Perth
 1890 Japp, William, of Broomhall, Alyth
 1871 Johnston, James, Cattle-dealer, Perth
 1871 Johnston, Stewart J., Loanleven, Huntingtower, Perth
 1881 Kerr, Thomas, Forehill, Caputh
 1878 KINCARDINE, The Hon. Lord, Dunkeld (6 Heriot Row, Edinburgh)

Admitted

- 1877 KINLOCH, Sir John G. S., of Kinloch, Bart., M.F., Meigle
 1879 KINNAIRD, Lord, Rossie Priory, Inch-ture
 1884 Kinnear, Chas., Tarsappie, Perth
 1853 KINNOUL, The Earl of, Dupplin Castle, Perth
 1879 Kyd, George, Perth
 1857 Latham, F. R., Taybank, Caputh, Dunkeld
 1879 Livingston, John, Brae of Cluny, Tullypowrie
 1884 Lumsden, J. D., Huntingtowerfield, Perth
 1871 M'Cash, John, Grain Merchant, Perth
 1884 Macdiarmid, Donald, Bank of Scotland, Aberfeldy
 1875 M'Diarmid, Duncan, Camusericht, Rannoch
 1855 Macdonald, Archd. Burns, Perth
 1857 Macdonald, Duncan, Comrie Farm, Aberfeldy
 1890 M'Donald, James, City Mills, Perth
 1880 Macdonald, Montague, of St Martins, Perth
 1861 Macdonald, William, of Balnakilly, Blairgowrie
 1871 Macdonald, William, "The Athole," Pitlochry
 1860 M'Dougall, Archd., Ardlananaig, Perthshire
 1871 M'Dougall, John, Goodlyburn, Perth
 1874 Macduff, Alex., of Bonhard, Perth
 1880 Macfarlane, David, Needburn, Methven
 1883 M'Gillwie, R., Union Bank, Dunkeld
 1882 M'Gregor, Athole, Eastwood, Dunkeld
 1872 Macgregor, Donald, Dainabo Cottage, Ballinluig
 1878 M'Intosh, James, Boatlands, Coupar-Angus
 1862 MACKENZIE, Sir Alex. M., of Dalvine, Bart., Dunkeld
 1890 Mackenzie, George A., Solicitor, Perth
 1885 Mackenzie, R. W. R., Stormontfield, Perth
 1878 Mackie, J. H. J., Invermay, Forgan-denny
 1879 M'Laren, Charles, Cally Lodge, Dunkeld
 1858 M'Laren, John, Retreat House, Scoon
 1879 M'Laren, Wm., Pittendrig, Meikleour
 1880 MacLeish, Wm., Town-Clerk, Perth
 1881 M'Leish, Dan., Wester Keilor, Methven
 1877 M'Leish, G. S., Wester Drumatherty, Dunkeld
 1884 M'Leish, James, Byres of Murthly, Perth
 1890 M'Millan, David, Calvine, Struan
 1892 M'Naughton, Alex., Manufacturer, Pitlochry
 1871 M'Naughton, Wm., Avon Villa, Abbot Street, Craigie, Perth
 1878 Macpherson, Allan, of Blairgowrie
 1885 Macpherson, Duncan, of Findyate, Tullypowrie
 1879 MacRitchie, David, of Easter Logie, Blairgowrie
 1883+MANSFIELD, The Earl of, K.T., Scoon Palace, Perth
 1887 Marshall, Jas. Burt, of Luncarty, Perth
 1880 Marshall, Rev. Theodore, Caputh Manse, Dunkeld
 1885 Marshall, Robert, Denmarkfield, Perth
 1887 Martin, Andrew, Montabor, Kinnoull, Perth
 1890 Martin, John Claude, Hilton, Perth
 1884 Mathew, John M., yr. of Auchmagne, Perth
 1887 Maxwell, Wm., of Donavoud, Pitlochry
 1841 Menzies, Fletcher Norton, Balmacnail, Ballinluig
 1879 Menzies, James, Coshioville, Aberfeldy

Admitted

- 1869 Menzies, Dr James, of Pitnacree, Ballinluig
 1877 Menzies, Neil James, yr. of Menzies
 1841 MENZIES, Sir Robert, of Menzies, Bart., Farleyer, Aberfeldy
 1879 Menzies, Robert, Tirlinie, Aberfeldy
 1887 Menzies, Wm. J. B. Stewart, of Chesthill, Aberfeldy
 1885 Middleton, Captain W. F., Baldrarie, Murthly
 1898 Millar, James Robert, Flawraig, Errol
 1887 Millar, Robert H., of Blair Castle, Culross
 1871 Millar, Wm., Over Kinfauns, Perth
 1890 Miller, George A., W.S., Perth
 1877 Mitchell, Hugh, Banker, Pitlochry
 1882 Mollison, James, Ruthven, Meigle
 1888 Moncrieff, R. H., Potterhill, W.S., Perth
 1889 MONCRIEFF, Sir Robt. D., of Moncrieffe, Bart., Perth
 1887 Morton, John, Muirton, Perth
 1879 Morton, R. G., Engineer, Errol
 1888 Munro, Chas., Union Bank, Aberfeldy
 1871 Murray, C. A., Taymount, Stanley
 1879 Nairne, T. G., Dunsinnan, Perth
 1874 Nairne, William, of Dunsinnan, Perth
 1844 Ogilvy, Lieut.-Col. Thos. W., of Ruthven, Meigle
 1871 Panton, John, of Dalnagairn and Carsie, Blairgowrie
 1878 Panton, William, Maryfield, Blairgowrie
 1880 Paton, Jas. Jun., Obney, Bankfoot
 1892 Paterson, Chas. J. G., of Castle Huntly, Longforgan
 1884 Philp, Alex., Mains of Duncrub, Dunning
 1871 Pirrie, James P., Coachbuilder, Perth
 1891 Pitcaithly, Geo., West Dron, Bridge of Earn
 1877 Pople, George, Newhouse, Perth
 1867 Pople, H. W., Royal British Hotel, Perth
 1861 Pople, J. B., of Newhouse, Letham House, Huntingtower, Perth
 1871 Pullar, Robert, of Tayside, Perth
 1884 Rae, W. A., Kingswood, Murthly
 1871 RAMSAY, Sir James H., of Bamf, Bart., Alyth
 1854 Rattray, Lieut.-Gen. J. C., of Craighall, C.B., Blairgowrie
 1874 Rattray, Dr J. C., of Coral Bank, Blairgowrie
 1890 Richardson, Colonel Edmund R. Stewart, of Ballathie, Stanley
 1891 RICHARDSON, Sir J. T. S., of Pitfour, Bart., Perth
 1861 Richmond, John, Dron, Bridge of Earn
 1871 Richmond, T., Hilton, Perth
 1892 Ritchie, George, of Hill of Ruthven, King's Place, Perth
 1879 Robertson, Alex., Ballechin, Ballinluig
 1893 Robertson, Daniel, Mains of Fordie, Dunkeld
 1879 Robertson, Don., Blackhill, Ballinluig
 1880 Robertson, E. W., of Auchleeks, Blair Athole
 1881 Robertson, James, Taymount, Stanley
 1851 Robertson, J. S., of Edradynate, Ballinluig
 1876 Robertson, J. S., yr. of Edradynate (Colquhualzie, Auchterarder)
 1864 Robertson, John, Old Blair, Blair Athole
 1892 Robertson, Colonel John Leslie, of Buttergleng, C.B., Dunkeld
 1879 Robertson, Wm., jun., of Craigloch, Perth
 1888 Robertson, Wm., Potato Merchant, Perth
 1879 Robertson, Wm., Engineer, Perth
 1878 Rodgie, Henry, 11 Marshall Place, Perth
 1871 Roy, Thomas, Craigcolowan, Perth

Admitted

- 1887 Sandeman, Col F S, Stanley House,
Stanley
1891 Sandeman, Lt Col Geo G, of Fonab,
Pitlochry
1879 Scott John, Gullin Cottage, Aberfeldy
1883 Scrimgeour, Peter, Balboughty, Perth
1891 Seaton, Donald, Cionan Coupar Angus
1890 Seller, James T, W S, Perth
1893 Sidey David, Middle Goudie, Dun
keld
1889 Small James, of Durnanean, Pitlochry
1887 Smart, James, Architect, Perth
1891 Smith, James, Drumbeltie, Lethendy,
Meikleour
1876 Smythe, Colonel David M, of Methven,
Perth
1890 Spalding, John F, Leiffie, Alyth
1889 Speedie, Matthew, Pitversie, Abernethy
1881 Spend, James, Founeth, Dunkeld
1890 Stead, W F, Balmdene House, Inch
ture
1880 Steel, Adam, yr of Blackpuk, Perth
1879 Stewart, D K, Munday, Aberdigne,
Perth

Admitted

- 1880 Stewart, John, of Ballechin, Tullypowrie
1891 Stevens, A B, Muns of Kilgastoun,
Bridge of Darn—*Free Life Member*
1889 Stewart, Daniel, Munhall, Perth
1881 Stewart, D D, Castlehill, Inchture
1888 Stewart, H D, Strathgury, Blan
Athole
1871 Stewart, James, Blan Athole
1876 Stewart, James, Butcher, Coupar Angus
1883 Stewart J F, Newmill, Stanley
1881 Storrar, Viscount, Scone Palace,
Perth
1871 Sutherland, Geo, The Peel, Tibbermuir
1878 Talbert, Peter, Glenrich Blangowrie
1881 Thomson, Thos, Ondon, Abernethy
1841 Watson, William, Inchcoonans, Errol
1881 Wedderspoon, Thos, Lave Stock Sales
man, Perth
1862 White, Dr Francis, Perth
1892 Whitson, W, Isla Park, Coupar Angus
1871 Whyte, Angus Kipney Cottage, Haillet
field, Logiealmond, Perth
1884 Whyte, Wm, Munhead, Forgandenny
1878 Wood, C L, of Fiesland, Forgandenny

3.—STIRLING DISTRICT.

EMBRACING THE

COUNTIES OF CLACKMANNAN, DUMBARTON, PERTH (WESTERN DIVISION), AND STIRLING.

CLACKMANNAN.

Admitted
1880 Alexander, James, Inch of Ferryton, Clackmannan
1887 Alexander, William, Loanside, Clackmannan
1871 Allan, William, Grassmainston, Clackmannan
1887 Arrol, Archd. T., Mill Grove, Alloa
1873†BALFOUR of Burleigh, Lord, Kennet, Alloa
1889 Blair, Charles, Devonshaw, Rumbling Bridge
1883 Bonallo, W. C., Harvieston Estate Office, Dollar
1891 Cairns, John, Dollarbank, Dollar
1872 Christie, John, of Cowden, Dollar
1891 Clarke, John, Meadowhill, Clackmannan
1880 Connal, Wm., Solsgirth, Dollar
1877 Crawford, John, High Street, Alloa
1872 Dewar, James, Balliliesk, Dollar
1889 Dickie, Robert, Westertown, Dollar
1892 Dobie, W. H., of Dollarbeg, Dollar
1873 Drysdale, David, Lorns Hill, Alloa
1890 Drysdale, William, King o' Muirs, Alloa
1879 Ferguson, John, Forthview, Clackmannan
1875 Fernie, James A., Hilton, Alloa
1873 Fisher, Donald, Jellyholm, Alloa
1888 Galashan, Alfred, Saddler, Alloa
1873 Galashan, Charles C., Saddler, Alloa
1878 Gibson, Thomas, Sherriffyards, Clackmannan
1874 Haig, J. R., of Blairhill, Dollar
1880 Haig, Robert, Dollarfield, Dollar—*Free Life Member*, 1887.
1875 Haig, W. J., of Dollarfield, Dollar
1878 Hare, Colonel, Blairlogie, Stirling
1858 Henderson, Robert, Nether Carsbridge, Alloa
1893 Kinross, D. A., Hillend, Clackmannan
1864 Kinross, John, Hillend House, Clackmannan
1874 Knox, Robert, Woodside, Cambus, Alloa
1888 Lang, James, Candleriggs, Alloa
1889 Leishman, William, of Broomrigg, Dollar
1882 M'Gregor, Alex., Craigton, Clackmannan
1885 M'Laren, J. T., Kennet, Alloa
1891 M'Laren, William, Longcarse, Alloa
1873 Macnab, James, of Middleton Kerse, Menstrie
1884 Macnab, John, Glenochil House, Menstrie
1890 Mair, William, Gartary, Clackmannan
1890 MAE and KELLIE, The Earl of, Alloa Park, Alloa
1848 Mitchell, Andrew, Alloa

Admitted
1873 Moir, James M'Arthur, of Hillfoot, Dollar
1875 Orr, James, of Harvieston, Dollar
1854 Riddell, Thomas, Geneva Lodge, Dollar
1869 Robertson, Rev. A. Irvine, Clackmannan
1881 Robertson, Alex., Schaw Park, Alloa
1878 Simpson, James, Tower, Alloa
1880 Sinclair, John, Westerton, Dollar
1870 Wilkie, David, Bridge Street, Dollar
1873 Young, George, Auctioneer, Dollar
1870 Younger, George, Brewer, Alloa
1889 Younger, James, Arns Brae House, Alloa

DUMBARTON.

1859 Anderson, John, Dullatur, Cumbernauld
1878 Anderson, John, Merkins, Alexandria
1872 Breingan, A., Merchant, Helensburgh
1857 Buchanan, Alex. Norwood, Milngavie
1878 Buchanan, David, Garscadden Mains, New Kilpatrick
1878 BUCHANAN, Sir Geo. H. Leith, of Ross, Bart., Alexandria
1861 Burns, J. W., of Kilmahew, Cardross
1857 Calder, James, Colgrain, Cardross
1888 CAMPBELL, Lady, of Garscube, Maryhill
1847 Campbell, J., of Tillichewan, Alexandria
1888 Campbell, J. A., Broomley, Alexandria
1889 Campbell, Wm. Middleton, of Colgrain, Dumbarton
1873 Colquhoun, George, Shemore, Luss
1872 COLQUHOUN, Sir James, of Luss, Bart., Rossduh, Luss
1881 Cullen, William, Barbegs, Croy
1867 Dalrymple, James, of Woodhead, Kirkintilloch
1850 Dennistoun, A. H., Rosslea, Helensburgh
1808 Douglas, Archibald C., of Mains, Milngavie
1892 Douglas, John, Braes o' Yette, Kirkintilloch
1881 Duncan, James, yr. of Auchendavie, Kirkintilloch
1881 Duncan, John, Auchendavie, Croy
1881 Duncan, Thos., Dullatur, Cumbernauld
1857 Ewing, Alexander Crum, of Keppoch, Cardross
1880 Findlay, R. E., of Boturich, Alexandria
1872 Galbraith, John, Edentaggart, Luss
1868 Gilmour, John, of Mount Vernon, Row
1881 Gilmour, William E., Woodbank, Alexandria

Admitted

- 1881 Graham, George, jun., Easter Board,
Gartshore, Croy
1861 Hain, David, Barremman, Clynder
1884 Jack, John S., Adrigbank, Milngavie
1873 Jardine, Andrew, Ballemenoch, Helens-
burgh
1888 Kennedy, James, Chesters, New Kil-
patrick
1873 Lennox, James, Shantron, Luss
1875 Lumsden, James, of Arden, Alexandria
1883 M'Auslan, Peter, Letruait, Row
1888 MacBrayne, David, yr. of Glenbranter,
Auchenteil, Helensburgh
1878 Macdonald, John, Boquhanran, Dalmuir
1892 M'Farlan, Coll Jas. Turner, Stronafyne,
Arrochar
1861 M'Farlan, John, Faslane, Garelochhead
1892 Macfarlan, Farlan, Faslane, Gareloch-
head
1878 M'Farlane, Colin, Strone, Glenfruin,
Garelochhead
1878 M'Farlane, Duncan, Greenfield, Gare-
lochhead
1872 M'Indoe, James, Glenmolachan, Luss
1865 Mackenzie, John, Letter Farm, Cove
1888 Mackenzie, Robert D., of Caldaran,
Alexandria
1878 Mackinlay, William, Ardoch, Cardross
1873 MacLachlan, Colin, Woodend, Helens-
burgh
1888 M'Lean, Thos., Banker, Alexandria
1872 M'Murich, James, Stuckievullich, Ar-
rochar
1873 M'Nab, Donald, Duchlaga, Luss
1882 M'Nab, Robt., Luss Hotel, Loch Lomond
1876 M'Nair, Robert, Westertown, New Kil-
patrick
1884 Macpherson, A. H., Tarbet Hotel, Loch
Lomond
1867 Martin, John M., of Auchendennan,
Alexandria, N.B.
1884 Millar, James, Kirk, Arrochar
1856 Milne, J., Union Bank of Scotland,
Helensburgh
1883 Murray, David, Moore Park, Cardross
1881 Park, Alex., Gartshore, Croy, Glasgow
1876 Robertson, R. W., Rockingham, Kil-
creggan
1885 Smollet, P. B., of Bonhill, Cameron
House, Alexandria
1882 Whitelaw, Alex., of Gartshore, Croy
1883 Wilson, James, Luss Estates Office,
Helensburgh
1881 Wright, W. Burt, of Auchinvole, Croy
1856 Young, James, Broadholm, Duntocher

PERTH

(WESTERN DIVISION).

- 1863 ABERCROMBY, Lord, Ferntower, Crieff
1888 Anderson, A. H., Kippendavie Estate
Office, Dunblane
1879 Anderson, James, Garbal Farm, Crian-
larich, Stirling
1857 Ballingall, D., Factor, Blairdrummond
1878 Barty, Jas. W., Solicitor, Dunblane
1864 Blair, James, Aberfoyle
1878 Buchanan, Francis W., Levey, Callander
1890 Buchanan, John, Inverardan, Crian-
larich
1865 Burns, James C., Fern Tower, Crieff
1861 Cairns, William, Belhie, Auchterarder
1871 Carrick, Charles, Baed, Stirling
1872 Carrick, T. A., Easter Cambusdrennie,
Stirling
1881 Christie, Gilbert, Auchlyne, Killin
1882 Cochran, Wm., Overdale, Dunblane
1874 Colquhoun, Rev. J. E. Campbell, Led-
cameroch, Dunblane

Admitted

- 1882 Cox, George A., of Inverrossachs, Cal-
lander
1882 Cox, James C., Inverrossachs, Callander
1879 Craig, John, Innergeldie, Comrie—*Free
Life Member*
1880 Craig, William, Gwydyr House, Crieff—
Free Life Member
1888 Crawford, Thos., Dumawhance, Crieff
1881 Crerar, Alex., Straid Cottage, Callander
1879 Cumming, David, Knockieston, Crieff
1871 Curr, Henry, Pitkellony House, Muthill
1864 Dewhurst, G. C., of Aberuchil, Comrie
1879 Dow, James, Clathybeg, Auchterarder
1860 Drummond, Col. Home, of Blairdrum-
mond, Stirling
1890 Duncan, Hector Macduff, yr. of Dam-
side, Auchterarder
1876 Dundas, Chas. Henry, Dunira, Crieff
1882 Dundas, Colin M., Commander E.N., of
Ochtertyre, Stirling
1864 Edington, Peter, Thornhill, Muthill
1873 Edmond, William, Kippendavie Mains,
Dunblane
1887 Fletcher, Angus, Auchtertyre, Tyndrum
1876 Forbes, Arthur Drummond, of Millearne,
Auchterarder
1861 Gardiner, Robert, of Rottearns, Henhill,
Forteviot
1884 Graeme, Robert, of Garvock, Bridge of
Earn
1859 Grieve, Michael, Wolseley Park, Cal-
lander
1857 Grieve, Robert, Glenfalloch, Crianlarich
1869 Hamilton, J. B. B., of Arnprior, Cal-
lander
1870 Hamilton, John, Conenish, Tyndrum
1846 Hamilton, J. B., of Leny, Callander
1873 Hart, Wm., Nether Garvock, Dunning
1889 Holmes, James, Auchintock, Dunblane
1884 Johnston, J. S., Fintalich, Muthill
1868 Kay, Wm., Inch Farm, Kincardine-on-
Forth
1873 Kinross, Andrew, Hungryhill, Dunblane
1801 Kirk, James, Kaimknow, Muckhart
1874 Kirkland, Major-General, of Wester For-
dell, Milnathort
1882 M'Ara, Alex., Culdees, Muthill
1885 M'Callum, Col. Kellie, of Braco
1887 M'Callum, Wm. R., Ballig, Crieff
1878 M'Caull, Peter, Knockhill, Bridge of
Allan
1858 M'Diarmid, D. A., Rockwood, Killin
1881 Macdonald, John M. S., of Monnchyle,
Lochearnhead
1890 MacEwen, Daniel, Merchant, Callander
1848 M'Ewen, John, Cambushtunie, Dunblane
1891 Macfarlane, Charles, East Brackland,
Callander
1865 M'Innes, Duncan, Milton Cottage, Crieff
1889 Mackenzie, Robert, yr. of Caldaran,
Westerton, Bridge of Allan
1881 Mackie, Peter, East Kirkton, Auchter-
arder
1872 MacLachlan, James, Donna Lodge, Donna
1859 M'Laren, J., Brae of Monzievauld, Crieff
1888 M'Laren, W. D., Drummore, Blairdrum-
mond
1861 MacLean, Duncan, Belnollo, Crieff
1873 M'Murich, Peter, Glen Allan, Dunblane
1871 M'Naughton, John, Inverlochuir, Bal-
quhiddler
1879 M'Naughton, Robert, of Cowden, Comrie
1857 M'Niven, A., Innishewan, Killin
1871 M'Rosty, James, Solicitor, Crieff
1872 Marshall, W. H., of Callander (25 Heriot
Row, Edinburgh)
1853 Millar, Hew, Newstead, Crieff
1879 Millar, John, Lochland, Crieff
1869 Moray, Lieut.-Colonel H. D., of Blair-
drummond, Stirling

Admitted

- 1882 Morgan, James, East Gogar, Blairlogie
 1882 Morris-Stirling, J. M., Gogar House, Stirling
 1882 Moubray, John James, of Naemoor, Dollar
 1883 Murdoch, John Burn, of Gartincaber, Blairdrummond, Stirling
 1880 Murray, Anthony G., of Dolerie, Crieff
 1879 Murray, David, Aberuchil, Crieff
 1873 Murray, John, Munnieston, Thornhill, Stirling
 1802 MURRAY, Sir Patrick Keith, of Ochertyre, Bart., Crieff
 1892 Pagan, John S., Coulshill, Auchterarder
 1890 Paterson, James, Burnbank, Blairdrummond
 1882 Paterson, John, Kirkton, Tyndrum
 1882 Paterson, Robert, Hill of Drip, Stirling
 1878 Paton, Robert, West Drip, Stirling
 1864 Reid, Walter, Craigarnhall, Bridge of Allan
 1887 Reid, Wm. David M., Pittentian, Crieff
 1861 Robertson, David, Allan Hill House, Dunblane
 1864 Robertson, D. G., of Torrie, Callander
 1887 Rollo, Lord, Duncrub House, Dunning
 1883 Rollo, The Hon. The Master of
 1888 Rollo, James, Rosenmont, Dunning
 1871 Ross, James E., Abercainry, Crieff
 1887 Russell, Archibald, Kilbride Castle, Dunblane
 1890 Sharp, George R., Bardrill, Blackford
 1888 Sharp, John, South Forr, Crieff
 1882 Sheppard, Rev. H. A. G., of Rednock, Port of Monteith
 1870 Speir, R. T. A., Culdees Castle, Muthill
 1875 Stark, M. C., Westerton Farm, Doune
 1856 Stewart, Chas., Tigh-u-duin, Killin
 1877 Stewart, Duncan, Callander
 1881 Stewart, Duncan, Monachyle, Callander
 1888 Stewart, Col. John, of Ardvairlich, R. A., Lochearnhead
 1878 Stewart, John, Bochastle, Callander
 1882 Stewart, Joseph, Oranlarich, Stirling
 1878 Stewart, Robert, Broom, Auchterarder
 1889 Stirling, Archd., of Keir, Dunblane
 1889 Stirling, James, Whiteston, Braco
 1879 Stirling, Col. Patrick, of Kippendavie, Dunblane
 1889 Stirling, T. Graham, of Strowan, Crieff
 1890 STRATHALLAN, Viscount, Machany, Auchterarder
 1885 Thomson, Samuel, Kamos, Doune
 1880 Tress, George Russell, Callander
 1882 Wallace, John, of Glasengall, Dunblane
 1885 Watters, Thomas, Glenample, Lochearnhead
 1861 Williamson, Col. D. R., of Lawers, Crieff
 1864 Wilson, Alex., Alford House, Dunblane
 1875 Wilson, John, Lecroft, Bridge of Allan
 1870 Young, Wm. S., Koir Mains, Dunblane

STIRLING.

- 1890 Adam, J. Denovan, Craigmill House, Stirling
 1864 Aitken, John G., Southfield, Stirling
 1878 Aitkenhead, Wm., Roughlands, Carron
 1864 Bayne, John, Builder, Bridge of Allan
 1876 Best, John, Inveravon, Polmont
 1877 Binnie, Thomas, Auction Mart, Falkirk
 1890 Blackburn, Adam, Killearn House, Glasgow
 1876 Blackburn, James, Killearn House, Glasgow
 1882 Blair, Robert, Inversnaid Hotel, Loch Lomond
 1886 Bolton, Edwin, West Flean, Bannockburn

Admitted

- 1858 Bolton, J. C., of Carbrook, M.P., Larbert
 1888 Brown, Charles, Kerse Estate Office, Falkirk
 1882 Brown, John, Brownville, Kilsyth
 1882 Brown, John A. H., of Quarter, Dunipace
 1854 Buchanan, Alexander, Whitehouse, Stirling
 1877 Buchanan, D. M. B., of Boquhan, Killearn
 1877 Buchanan, John, Gartness, Killearn
 1876 Buchanan, Robert, Blairquosh, Strathblane
 1876 Buchanan, Robt., Letter Farm, Killearn
 1869 Bulloch, Archibald, Milliken, Maryhill
 1882 Buntine, J. R., Sheriff-Subt., Stirling
 1891 Cairns, William, Burnside, Alva
 1882 Campbell, Capt. Henry J. Fletcher, R.N., Boquhan, Kippen, Stirling
 1873 Christie, James, Coxethill, St Ninians
 1877 CONNOL, Sir Michael, of Parkhall, Killearn
 1882 Couper, James, Craigforth, Stirling
 1881 Dawson, John M., Elcho House, Balfron
 1864 Dewar, A., Arnprior, Kippen
 1864 Dewar, Peter, King's Park, Stirling
 1864 Douie, J. K. L., Polnaisie, Stirling
 1890 Drummond, James W., Seed and Nursery Establishment, Stirling
 1891 Drysdale, John, Fairfield, Kippen
 1875 Duncan, A. R., Blairquosh, Strathblane
 1885 Duncan, J. Dalrymple, Meiklewood, Stirling
 1869 Edmond, David, of Ballochruin, Balfron
 1878 Edmond, Wm., Hillhead of Catter, Drymen
 1889 EDMONSTONE, Sir Archd., of Duntreath, Bart., Colzium, Kilsyth
 1862 Erskine, H. D., of Cardross, Stirling
 1861 Ewing, Sir Archd. Orr, of Ballikrain, Bart., M.P., Killearn
 1890 Fisher, Daniel, Ballamenach, Bucklyvie
 1864 Fleming, James, Carnuir, Falkirk
 1860 Forbes, William, of Callendar, Falkirk
 1888 Fraser, John, Balfunning, Drymen
 1892 Fraser, William L., of Arngibbon (24 Belhaven Terrace, Glasgow)
 1880 Galbraith, J., Croy Cunningham, New Killearn Station
 1878 Galbraith, T. L., Town-Clerk, Stirling
 1878 Gray, Andrew, West Flean, Bannockburn
 1873 Gray, James, Kersie Mains, Stirling
 1891 Gray, James, jun., Birkenwood, Gargunock
 1873 Guild, And., Rhodars, Alva
 1881 Hamilton, Alex., Commercial Bank, Stirling
 1859 Hamilton, W. F., The Elms, Lauriston, Falkirk
 1868 Hamilton, C. H., Dunmore Park, Larbert
 1858 Hannay, John, of Cairnhill, Stirling
 1878 Hay, James S., Clydesdale Bank, Falkirk
 1878 Henderson, A. W., Bridge of Allan
 1877 Henderson, William, of Redford, Linlithgow
 1864 Inglis, John, Kepdarroch, Gargunock
 1891 Inglis, Robt., Patrickstone, Gargunock
 1881 Jaffray, William, Broomridge, St Ninians
 1877 Jardine, Wm., Bogside, Fintry
 1884 Kay, Andrew, Little Kerse, Kippen
 1875 Kay, Charles, Mill Farm, Gargunock
 1881 Kay, Robert, Mains Farm, Gargunock
 1878 Ker, T. Ripley, of Dougalston, Milngavie
 1857 Kerr, Robert, Ballikrain, Killearn
 1868 King, C. M., Anternony House, Milton of Campsie
 1857 KING, Sir James, of Campsie, Bart., Stirlingshire
 1864 Lang, John, Beild, Gargunock
 1869 Learmonth, T. L., of Park Hall, Polmont

Admitted

- 1884 Learmonth, Wm., Bowhouse, Grangemouth
 1864 Leishman, T., 25 Park Terrace, Stirling
 1891 Lowe, F. R., Fernfield, Bridge of Allan
 1885 Luke, John, Headswood, Denny
 1857 Macadam, John, Blair'o'er, Drymen
 1873 M'Alpine, James, Springfield, Stirling
 1888 Macdonald, Donald, Herbertshire Castle, Denny
 1857 M'Farlan, Lt.-Col. John W., of Ballenclooch, Campsie Glen
 1891 Macfarlane, James, Oxhill, Bucklyvie
 1891 Macfarlane, Parlane, Darnley House, Queen's Road, Stirling
 1886 Macfarlane, Robt. C., West Carse, Stirling
 1884 M'Indoe, Robert, Knowshead, Campsie
 1891 M'Keich, William, Woodend, Bucklyvie
 1891 M'Kerracher, Daniel, Raploch, Stirling
 1873 M'Lachlan, Archibald, 32 Queen Street, Stirling
 1887 M'Laren, D., Cornton, Bridge of Allan
 1891 M'Laren, James, Banderath, Stirling
 1881 Maclean, J. Grant, Norwood, Bridge of Allan
 1888 M'ONIE, Sir Wm., Ballochneck, Bucklyvie
 1867 MAITLAND, Sir James, of Barnton, Bart., Sauchie Burn, Stirling
 1880 Malcolm, W. T., Dunmore, Airth Station, Stirling
 1882 Melville, John H., Eriden, Falkirk
 1890 Mitchell, David, Millfield, Polmont
 1891 Mitchell, William, Blackdub, Stirling
 1890 Moir, Alastair E. Graham, of Leckie, Gargunnoch
 1881 Moir, Alex., Nether Carse, Gargunnoch
 1883 Munro, A. B., of Auchinbowie, Stirling
 1876*† MONTROSE, The Duke of, Buchanan Castle, Drymen
 1876 More, John, Fordhead, Kippen
 1873 Morrison, James M., Banker, Stirling
 1880 Morton, David, Ironmonger, Stirling
 1873 Muirhead, Wm., Pirnhall, Bannockburn
 1881 Murray, Captain A. B., Gartur, Stirling
 1861† Murray, James, Catter House, Drymen
 1890 Murray, J. Campbell, Blairquhosh, Strathblane
 1863 Murray, Lieut.-Col. John, of Polmaise, Stirling
 1873 Nimmo, Alex., of West Bank, Falkirk
 1853 Nimmo, Matthew, Baed, Stirling
 1890 Paterson, James, Burnbank, Stirling
 1882 Paterson, Robert, Hill of Drip, Stirling
 1873 Paton, John, of Viewforth, Stirling
 1873 Paton, Robert, West Drip, Stirling
 1873 Patrick, James, Queenzieburn, Kilsyth
 1891 Paul, Walter, Laighpark, Milngavie
 1880 Peat, John, Manor, Blairlogie, Stirling
 1864 Philp, Robert, Royal Hotel, Bridge of Allan
 1881 Pollock, J. J., of Auchinaden, Strathblane
 1891 Provan, John, Drum of Kinnaird, Larbert
 1887 Pullar, Edmund, Coneyhill House, Bridge of Allan
 1883 Rankin, Robert, Inchtarf, Kirkintilloch
 1868 Rankine, R. W., Rosebank, Falkirk

Admitted

- 1891 Rawding, George, Bridgehaugh, Stirling
 1880 Reid, Andrew, Haining Valley, Linlithgow
 1882 Rennie, James, Corrie, Kilsyth
 1882 Risk, James, Drumbrar, Bridge of Allan
 1882 Ritchie, Wm., West Pleau, Stirling
 1855 Robertson, John, Candie, Polmont
 1873 Sands, James, Greenfoot, Gargunnoch
 1881 Scott, Rev. John, Camelon Manse, Falkirk
 1884 Scott, Thomas, South Woodend, Bonnybridge
 1873 Scoular, John, Crook, Stirling
 1864 Sheriff, John Bell, Carronvale, Larbert
 1881 Slessor, Rev. Alex., The Manse, Balforn
 1857 Smith, Adam, Lochlands, Larbert
 1893 Smith, James Kemp (Messrs Kemp & Nicholson), Stirling
 1864 Smith, Rbt., of Brencham Park, Stirling
 1889 Speedie, John C., Rockdale, Stirling
 1862 Stark, Ralph, of Summerford, Falkirk
 1881 STRAUAT, Sir Alan H. Seton, of Touch, Bart., Stirling
 1882 Stevenson, John, Gateside, Denny
 1861 Stewart, Jas. Ross, Meiklewood, Stirling
 1879 Stewart, M. H. Shaw, of Carnock, M.P., Larbert
 1868 STIRLING, Sir C. E. F., of Glorat, Bart., Milton of Campsie
 1857 Stirling, Major G., of Craigbarnet, Lennoxtown
 1867 Stirling, James, of Garden, Kippen
 1866 Stirling, Col. John S., of Gargunnoch, Stirling
 1881 Stirling, Robert, Pendreich, Bridge of Allan
 1855 Stirling, William, of Tarduff, Linlithgow
 1873 Taylor, James, Buchanan, Drymen
 1890 Taylor, R., Craighead, Blairdrummond, Stirling
 1877 Taylor, Robert, Solicitor, Stirling
 1879 Thomson, James, Coach Works, Stirling
 1873 Thomson, William, Nyaad, Stirling
 1881 Turnbull, Jas., Carnock Smithy, Larbert
 1875 Ure, George, Wheatlands, Bonnybridge
 1875 Ure, George R., Hope Park, Bonnybridge
 1874 Ure, William, Bogton, Larbert
 1873 Walls, Robert, Kerse Mills, Stirling
 1890 Waters, J. C. Dun, of Craigton, Balforn
 1877 Watson, John, Skipperton, Denny
 1871 Waugh, Allan, Avonbridge, Falkirk
 1881 Webster, James, Mungall Mill, Larbert
 1881 Welsh, Patrick, Stirling
 1864 Wilson, Alexander, Bannockburn House, Bannockburn
 1881 Wilson, David, jun., of Carbeth, Killearn
 1864 Wilson, E. L., Bannockburn
 1850 Wilson, John, of Auchinck, Killearn
 1861 Wilson, William, Bannockburn House, Bannockburn
 1891 Wilson, William Ralph, Hill Park, Bannockburn
 1891 Yellowlees, Robert, Provost of Stirling
 1867 Young, Andrew, 4 Clarendon Place, Stirling
 1879 Young, John, Cobbleburn, Carron
 1873 Young, William Taylorton, Stirling

4.—EDINBURGH DISTRICT.

EMBRACING THE

COUNTIES OF EDINBURGH, HADDINGTON, AND LINLITHGOW.

EDINBURGH.

Admitted

- 1878 Adam, Robert, City Chamberlain, Edinburgh
 1869 Ainslie, David, of Costerton, Blackshields
 1848 Ainslie, John, Hillend, Lothianburn
 1865 Aitchison, Lieut.-Col., of Drummore, Musselburgh
 1877 Aitken, Dr A. P., 8 Clyde Street
 1854 Aitken, James, Fairhaven, Eskbank
 1854 Aitken, T., 11 Hope Street, Portobello
 1860 Aitken, T., 5 Grosvenor Crescent
 1869 Alexander, A., 34 St Andrew Square
 1878 Allan, Jn., 1 MacLaren Road, Newington
 1892 Allan, Thomas, Clifton, Mid-Calder
 1893 Allison, James, Claylands, Ratho
 1881 Amour, John, Cramond Bridge
 1877 Anderson, Charles, jun., 377 High Street
 1884 Anderson, J. R., W.S., 52 Palmerston Place
 1884 Anderson, R. K., 377 High Street
 1881 Anderson, W. M., Pirntaton, Stow
 1878 Andrew, Robert, Smeaton, Dalkeith
 1865 Archbald, T., of Viewbank, Lasswade
 1876 Archbald, T. B., 36 Craigmillar Park
 1860 Archibald, James, Overshields, Fountain-hall
 1869 Archibald, John, Overshields, Fountain-hall
 1887 Armstrong, W. J., 57 Manor Place
 1877 Auld, Peter, 21 Millerfield Place
 1893 Bailey, Col. F., Professor of Forestry, Edinburgh University, 7 Drummond Place
 1876 Baird, Colin C., V.S., Clyde Street
 1843 Baird, Sir James Gardiner, of Saughton Hall, Bart., 9 Leamonth Terrace
 1877 Baird, Jn. W., 7 Union Street
 1879 Balfour, Professor I. B., Inverleith House
 1880 Balfour, J. H., 7 Glencairn Crescent
 1883 Bantgett, John, 1 Gayfield Street, Gayfield Square—*Free Life Member*
 1861 Bathgate, James, Middleton Lime Works, Gorebridge
 1854 Baxter, Edmund W., 9 Rutland Square
 1875 Bayley, George, 7 Randolph Crescent
 1876 Beith, Donald, W.S., 15 Grosvenor Crescent
 1882 Belfrage, A. J., 8 Durham Road, Portobello
 1871 Belfrage, A. W., C.E., 1 Erskine Place
 1840 Belfrage, J., 40 Craigmillar Park
 1893 Bell, John Dalrymple, of Clifton Hall, Ratho
 1871 Bell, John, of Castlecreavie, 35 Dublin Street
 1877 Bertram, D. N., St Katherine's Works, Sciennes
 1891 Black, A. D. M., W.S., 28 Castle Street
 1862 Blackwood, William, 45 George Street

Admitted

- 1874 Blair, John, W.S., 9 Ettrick Road
 1879 Blair, Patrick, W.S., 27 St Andrew Square
 1861 Blues, Andrew A., 14 North Mansion House Road
 1870 Boog, Thomas Elliot, 8 Morningside Park
 1846 Bothwick, John, of Crookston, Heriot
 1878 Brechin, James, 60 Queen Street
 1857 Brockley, Robert M., Gourlaw, Rosewell
 1877 Brodie, Sir Thomas D., of Idvies, Bart., W.S., 9 Ainslie Place
 1890 Brodie, William Alex. G., 15 Rutland Square
 1877 Brown, James, Spittal, Penicuik
 1881 Brown, Richard, C.A., 28 St Andrew Square
 1869 Brown, Robert, Hillhouse, Kirknewton
 1882 Brown, Wm., Currievale, Currie
 1877 Bruce, E., 26 Greenside Place
 1865 Brunton, Wm., 4 Bernard Street, Leith
 1878 Bryce, And., Craighentilly, Edinburgh
 1858*† Buccleuch and Queensberry, The Duke of, K.T., Dalkeith House, Dalkeith
 1880 Buchan, Alex., LL.D., 72 Northumberland Street
 1882 Buchanan, Ben., Springbank, Corstorphine
 1892 Buchanan, Charles, Land Steward, Penicuik
 1872 Buchanan, John, C.E., 24 George Street
 1884 Burn, C. M. P., Prestonfield House, Edinburgh
 1877 Burnett, Alex. E., W.S., 129 George St.
 1838 Burnley, W. F., 24 Ainslie Place
 1887 Burton, J. Tait, of Toxside, Gorebridge
 1857 Burton, J., 36 Findhorn Place
 1884 Byres, Wm., Beadmill, West Calder
 1878 Caird, Alex. McNeil, 73 Inverleith Row
 1887 Cairns, Wm., Dairyman, Fountainbridge
 1851 Calder, W., 19 Archibald Place
 1886 Calder, William, 21 Commercial Street, Leith
 1887 Callander, Henry, of Preston Hall, Dalkeith
 1870 CAMPBELL, Sir Archd. S. L., of Succoth, Bart., 23 Moray Place
 1880 Campbell, Arthur, 4 Randolph Crescent
 1889 Campbell, George, W.S., 51 Castle Street
 1860 Campbell, James G., of Killyleoch, 23 Windsor Street
 1890 Campbell, P. W., W.S., 1 North Charlotte Street
 1887 Campbell, W. G., 23 Lynedoch Place
 1889 Carfrae, Geo., C.E., 1 Erskine Place
 1869 Carphim, James R., C.A., 14 Hanover Street
 1893 Charteris, John (Drummond Brothers), 17 Greenside Place
 1887 Chiene, Prof., 26 Charlotte Square
 1862 Christie, C. J., 6 Glenorchy Terrace

Admitted

- 1884 Christie, Wm., Ardveich Lodge, Liberton
 1885 Church, D. M., 27 Minto Street
 1886 Clapperton, Jn., Gillsland, Spylaw Road
 1888 Cleghorn, Thomas, Craigour, Liberton
 1876 Clerk, Sir George Douglas, of Penicuik, Bart.
 1875 Clarkson, Alex., Ormiston, Kirknewton
 1884 Cook, Charles, W.S., 61 Castle Street
 1882 Cook, Henry, W.S., 61 Castle Street
 1892 Cook, James, Arniston, Gorebridge
 1885 Cook, Wm. Home, C.A., 42 Castle Street
 1892 Corstorphine, J. E. E., 12 West Castle Road
 1885 Cousin, George, 140 Princes Street
 1880 Cowan, G. W., of Logan House, Penicuik
 1872 Cowan, George, Valleyfield, Penicuik
 1874 Cowan, James, 35 Royal Terrace
 1858 Cowan, John, of Beeslack, Milton Bridge
 1879 Cowan, John, W.S., 12 Hill Street
 1879 Cowan, John, 13 South St Andrew St.
 1882 Cowan, R., 13 Greenside Street
 1892 Cox, Robert, of Gorgie, 84 Drumsheugh Gardens
 1877 Crabbie, John M., 38 Chester Street
 1868 CRAIG, Sir J. H. Gibson, of Riccarton, Bart., Currie
 1877 Craig, Dr William, 7 Bruntsfield Place
 1877 Craik, John, The Bush, Roslin
 1849 Crichton, Hew Hamilton, W.S., 13 Nelson Street
 1875 Croall, Robt., Craigcrook Castle, Blackhall
 1888 Cross, Adam P., Bowling Green Street, Leith
 1880 Cross, Alexander, 2 Chalmers Street
 1870 Cunningham, C., V.S., Slateford
 1888 Cunningham, Geo. M., C.E., 135 George Street
 1883 Cunningham, St Clair, Bowling Green Street, Leith
 1877 CUNYNGHAM, Sir R. K. A. Dick, of Prestonfield, Bart.
 1887 Curror, David, 25 Northumberland St.
 1878 Curror, P. R., Myreside, Edinburgh
 1875 Dalgleish, Geo., Rosebery Mains, Gorebridge
 1857 Dalgleish, John J., 8 Atholl Crescent
 1888 Dalgleish, L., 1 Rutland Square
 1888 DALKEITH, The Earl of, Dalkeith Palace, Dalkeith
 1882 Dallas, D. F., S.S.C., 24 Charlotte Square
 1882 DALRYMPLE, Sir Charles, of New Hailes, Bart., M.P., Musselburgh
 1878 Dalziel, George, W.S., 66 Queen Street
 1888 Dalziel, William, Muirhousedyke, West Calder
 1888 Darling, J. F. Stormonth, 38 Palmerston Place
 1877 Davidson, James I., Saughton Mains, Gorgie
 1850 Davidson, W. J., 32 Drumsheugh Gardens
 1888 Davidson, W. S., 54 Castle Street
 1850 Deans, Peter D., 62 Great King Street
 1877 Dewar, James Cumming, of Vogrie, Ford
 1888 Dewar, John R. W., V.S., Dick Veterinary College, 8 Clyde Street
 1884 Dickson, James, Damhead, Loanhead
 1850 Dickson, James J., C.A., 122 George St.
 1879 Dickson, T. G., 3 North St David Street
 1878 Dickson, W. T., W.S., 11 Hill Street
 1892 Dippie, A. G., 30 St Andrew Square
 1886 Dobbie, John, Campend, Dalkeith
 1886 Dobbie, John, Contractor, Leith
 1889 Dods, Archibald, Ralshawkiln, Gorebridge
 1884 Douglas, James, Cousland, Dalkeith
 1885 Douglas, William, Beaver Bank, Canonmills
 1858 Dowall, Alex., 13 Palmerston Place

Admitted

- 1869 Downie, Hay, Corstorphine
 1888 Drybrough, Thos., 81 Royal Terrace
 1880 Dun, Finlay, 130 George Street
 1884 Duncan, Peter, Eskbank, Dalkeith
 1848 Duncan, William, S.S.C., 18 Abercromby Place
 1876 Duncan, William, S.S.C., 18 York Place
 1893 Dundas, Capt. Robert, yr., of Arniston, Gorebridge
 1878 Dundas, Ralph, W.S., 16 St Andrew Sq.
 1847 Dundas, Robert, of Arniston, Gorebridge
 1880 Dundas, William J., C.S., 16 St Andrew Square
 1872 Dunlop, George, W.S., 20 Castle Street
 1877 Dunn, Malcolm, The Gardens, Dalkeith
 1858 Durie, David, Ludgate Lodge, Ratho
 1878 Dykes, James, Cucklen, Penicuik
 1874 Edgar, John, Kirketell, Roslin
 1877 Elder, James, Roddinglaw, Currie
 1892 Elder, Samuel, Whitehill Mains, Musselburgh
 1876 Ferguson, Archd. A., 196 High Street, Portobello
 1868 Ferguson, John, Burghlee, Loanhead
 1869 Finlay, John H., W.S., Register House
 1890 Fisher, Thomas, Whitehill, Roswell
 1864 Fleming, James Nicol, 12 George Square
 1882 Fleming, Jas. S., 16 Grosvenor Crescent
 1875 Fletcher, John D., 6 Barnton Terrace, Blackhall
 1878 Ford, G., Saughton Hall Mains, Murrayfield
 1868 Fordyce, J. D., 84 Great King Street
 1871 Forgan, Andrew, 14 Claremont Terrace
 1863 Forman, John, 61 Great King Street
 1882 Forrester, John, 89 Broughton Place
 1877 Foulis, David, 61 George Street
 1869 Foulis, Sir Jas. Liston, Bart., Millburn Tower, Corstorphine
 1868 Fraser, Alex., Canonmills Lodge
 1877 Gardner, Wm., East Langton, Mid-Calder
 1886 Garson, Wm., W.S., 5 Albany Place
 1887 Geddes, G. H., 21 Young Street
 1868 Gibson, James, 2 Chalmers Crescent
 1856 Gibson, Rev. John, 23 Regent Terrace
 1869 Gibson, T., Bainfield, Fountainbridge
 1847 GILLESPIE, Sir John, W.S., 53 Northumberland Street
 1890 Gilmour, R. Wulridge Gordon, of Craigmillar
 1869 Glendinning, G. R., Hatton Mains, Wilkieson
 1874 Glendinning, J. P., Overshiels, Mid-Calder
 1865 Goldie, R. G. M., 8 Comely Green Place
 1888 Gow, Andrew, Cranston Riddell, Dalkeith
 1887 Graham, William, 9 Hill Street
 1861 Gray, James, Brachead Mains, Cranonnd Bridge
 1884 Gray, James, Harperigg, Kirknewton
 1878 Gray, Robert Smith, Southfield, Dud-dingston
 1870 Greig, James A., 6 Rutland Square
 1877 Greig, R. M., Fountainbridge
 1880 Grey, John Edward, 20 Lauriston Place
 1880 Grieve, John, Balmoral Hotel, Princes Street
 1898 Guild, Alexander, Greenhead, Pencaitland (2 Thistle Court)
 1877 Gulland, W. J., Monkton Hall, Musselburgh
 1860 Hagart, J. V., W.S., 140 Princes Street
 1864 Halkett, Lieut.-Col. J. C., of Cramond
 1878 Hamilton, Robert, 20 St James Square
 1864 Hamilton, Wm., of Cairns, Kirknewton
 1843 Handyside, W., 21 Magdala Crescent
 1884 Harper, James, Foriel, Dalkeith
 1871 Harper, William, Sheriffhall Mains, Dalkeith

Admitted

- 1898 Harwell, John Hood, Whitamoss, Kirknewton
 1875 Hay, Alex., 100 Constitution St., Leith
 1862 Hay, James, 9 Castle Street
 1898 Henderson, Allan Macfarlane, 89 Palmerston Place
 1863 Henderson, Jas., Walton, Corstorphine
 1876 Henderson, John, C.A., 40 Leamington Terrace
 1868 Higgins, Robert, 4 Garscube Terrace, Murrayfield
 1863 Hogg, Henry, Symington Mains, Stow
 1876 Hogg, Robert, 18 Ann Street
 1859 Hogg, Robert, Rosemay, Leadburn
 1880 Hogg, Thos., Oxford Mains, Dalkeith
 1858 Hood, Archibald, Rosewell
 1878 Hope, Alex., Pinkie House, Musselburgh
 1848 Hope, Jas., of Belmont, Murrayfield
 1877 Hope, James Edward, New Club
 1804 Howe, Alex., W.S., 32 Charlotte Square
 1887 Howie, Archibald, Rosebery, Gorebridge
 1877 Hunter, J., jun., Woodhall Mains, Juniper Green
 1858 Hunter, Wm. B., Aracan Cottage, Musselburgh
 1872 Hutchison, J. T., 12 Douglas Crescent
 1875 Hutchison, Thos., Bellfield, Duddingston
 1876 Hutchison, Thos., Broomhills, Loanhead
 1877 Inch, Robert, 1 Victoria Street
 1869 Inglis, A. W., 30 Abercromby Place
 1884 Inglis, H. H., W.S., 8 North St David St.
 1887 Innes, John C., W.S., 32 Queen Street
 1872 Jack, Gavin, Swanston, Lothianburn
 1800 Jack, Samuel, Oricton Mains, Dalkeith
 1809 Jack, Thomas, Hermiston, Currie
 1885 Jameson, Andrew, 14 Moray Place
 1860 Jameson, G. A., C.A., 24 St Andrew Sq.
 1874 Jameson, J. A., W.S., 60 Queen Street
 1858 Jameson, Wm. H., Thornlie Villa, Loanhead
 1869 Jeffrey, David, 14 Randolph Crescent
 1880 Jenkinson, A. D., 10 Princes Street
 1872 Johnson, W. H., Tweed Villa, Relugas Road
 1852 Johnston, Alex., Hailes, Slateford
 1877 Johnston, L., 11 Castle Street
 1862 Jones, Charles Digby, 14 Lynedoch Place
 1868 Kay, Wm., Broomieknowe, Lasswade
 1898 Keith, Davidson, 65 George Street
 1800 Kennaway, Robt., 10 Middleby Street
 1888 Kerr, George, 9 Great Stuart Street
 1884 Kerr, John, Yorkston, Gorebridge
 1880 Kerr, Thomas, W.S., 16 Hill Street
 1600 Kidd, Walter, Bally, Currie
 1872 King, James, West Mills, Colinton
 1871 King, J. F., Chambers Street
 1876 Kinnear, C. G. H., 12 Grosvenor Cres.
 1877 Laing, Alex., S.S.C., Glenord, Spylaw Road
 1898 Laird, Robert, 17 Frederick Street
 1884 Laundon, Robert, Malcolmstone, Currie
 1878 Landale, James, 1 Summerfield, Leith
 1855 Landale, Thomas, 5 Chalmers Crescent
 1868 Lauder, Alex., Goshen, Musselburgh
 1877 Laurence, P., 50 Frederick Street
 1872 Lawrie, John W., Stow
 1872 Lawrie, Thos., Esperson, Gorebridge
 1863 Lee, John, 22 Glenorchy Terrace
 1857 Lewie, Jas., 22 Duke Street, Edinburgh
 1884 Lindsay, Robert, Royal Botanic Garden
 1889 Lindsay, W. P., W.S., 10 Queen Street
 1806 Lockhart, R., jun., 10 Polwarth Terrace
 1884 Logan, C. B., W.S., 23 Queen Street
 1874 Lothian, M. J., Redwood, Spylaw Road
 1891 Lowe, W. D., W.S., 66 Queen Street
 1850 Lyall, Robt., Rosefield Place, Portobello
 1859 Macadam, Dr S., Surgeons' Hall
 1884 Macadam, Prof. W. Ivson, Surgeons' Hall
 1885 M'Alpine, A. N., 2 Marchmont Street

Admitted

- 1874 McCallum, A. I., 10 Grassmarket
 1864 M'Candlish, John M., 27 Drumshough Gardens
 1883 Macdonald, James, 8 George IV. Bridge
—Secretary of the Society
 1886 Macdonald, R. B., Granton Mains, Edin.
 1875 M'Dougal, Thos., Eskvale, Penicuik
 1870 M'Dowall, Andrew, Harelaw, Currie
 1878 M'Dowall, T. N., Remote, Dalkeith
 1862 Macfie, C., of Gogarburn, Corstorphine
 1865 Macfie, D. J., of Borthwick Hall, Heriot
 1869 Macfie, Wm., of Clermiston, Corstorphine
 1877 M'Gowan, Robert, 46 Fountainhall Road
 1870 M'Gowan, William, 46 Fountainhall Rd.
 1869 Mackenzie, A. K., of Ravelrig, 19 Grosvenor Crescent
 1879 Mackenzie, A. D., 6 Harrington Gardens
 1884 Mackenzie, D. F., Morton Hall, Liberton
 1845 Mackenzie, John, New Club
 1879 Mackenzie, John, W.S., 16 Royal Circus
 1848 Mackenzie, J. Ord, W.S., 9 Hill Street
 1892 M'Kinnon, George, Melville Castle, Lasswade
 1892 MacLagan, Philip R. D., 14 Belgrave Pl.
 1858 MACLAGAN, Prof. Sir Douglas, 28 Heriot Row
 1873 MacLagan, R. C., M.D., 5 Coates Crescent
 1881 M'Laren, Alex., 11 Assembly St., Leith
 1892 MacLennan, Wm., Prestondene, Ford, Dalkeith
 1883 Macpherson, C. E. W., C.A., 28 St Andrew Square
 1882 Macpherson, Prof. N., 2 Randolph Cliff
 1877 Maitland, David, of Dundrennan, New Club
 1870 Maitland, Col. K. Ramsay, 26 Castle Ter.
 1856 Marjoribanks, J., 2 Victoria Terrace, Musselburgh
 1877 Mark, Robert, Valleyfield Street
 1880 Massie, W. H., 1 Waterloo Place
 1875 Mather, Edward, The Lee, Edinburgh
 1871 Matheson, Kenneth, 58 Morningside Drive
 1871 Matthew, P. M., 32 Coates Gardens
 1855 Maxwell, Jas., Glenorse Mains, Milton Bridge
 1869 Melrose, Patrick, Tower House, Tower Street, Portobello
 1840 Melvin, Jas., 48 Drumshough Gardens
 1868 Menzies, D., C.E., 39 York Place
 1871 Menzies, Robert, S.S.C., 10 Duke Street
 1870 Menzies, William J., W.S., 128 George Street
 1870 Merricks, H. J., Hay Mains, Harburn, West Calder
 1870 Merricks, J. L., Gunpowder Mills, Roslin
 1862 Methuen, John, Dunforth, Trinity
 1884 Methven, John, 6 Bellevue Crescent
 1892 Mettam, A. E., Veterinary College, 8 Clyde Street
 1882 Mill, George, 21 St Andrew Square
 1883 Milne, Alex., 32 Hanover Street
 1887 Mitchell, David, Lauriston, Davidson's Mains
 1880 Mitchell, Wm., S.S.C., 11 South Charlotte Street
 1892 Moffat, James, 48 Castle Street
 1876 Moir, Peter, 74 Nicolson Street
 1848 Moncreiff, Lord, 15 Great Stuart Street
 1885 Moncreiff, Hon. Jas. W., 6 Ainslie Pl.
 1806 Moncreiff, D. S., W.S., 24 George Square
 1872 Mortimer, T. A., 86 George Street
 1884 Morton, Thomas, Redheugh, Gorebridge
 1886 Morton, The Earl of, Dalmahoy, Wilkieston
 1887 Mungle, John T., West Calder
 1891 Munro, Duncan, 8 Dalrymple Place—*Fres*
Life Member
 1886 Munro, John C., yr. of Marchbank, Balerno

Admitted

- 1880 Munro, William, of Marchbank, Balerno
 1875 Murdoch, Geo. Burn, 31 Morningside Road—*Free Life Member*
 1870 Mure, William J., 39 Heriot Row
 1880 Murray, Lieut.-Col., C. S., 143 Warrender Park Road
 1877 Murray, A. G., 7 Rothesay Terrace
 1880 Murray, Robert, 18 Lonsdale Terrace
 1875 Murray, R. W. E., Blackford House, Blackford Avenue—*Free Life Member*
 1887 Murray, Thomas, Braidwood, Penicuik
 1890 Murray, T. M., W.S., 12 Lennox Street
 1885 Murray, Wm. Hugh, W.S., 48 Castle St.
 1890 Mylne, James, W.S., 36 Castle Street
 1888 Naismith, R. T., 2 Ethel Terrace, Plewlands
 1890 Nisbet, Chris. C., of Stobahiel, W.S., 23 York Place
 1847 Nisbett, J. M., of Cairnhill, Drum, Edin.
 1860 Niven, A. T., C.A., 16 Young Street
 1862 Norie, H. H., Union Bank, Edinburgh
 1883 Oliver, James, 8 Howard Place
 1876 Ovens, William R., Leith
 1874 Park, Ebenezer, Greenside Lane
 1863 Park, James, Stoneyhill, Musselburgh
 1873 Park, J. D., Greenside Lane
 1874 Park, William, Brunstane, Portobello
 1889 Pate, Thomas, Windydoors, Stow
 1864 Paterson, D. A., Merchant, Leith
 1877 Paterson, George, Falmills, Penicuik
 1878 Paterson, James, of Bankton, Mid-Calder
 1877 Paterson, John, Meadowspott, Dalkeith
 1876 Paterson, J. T. S., 55 Grange Loan
 1877 Paterson, Richard L., Meadowspott, Dalkeith
 1869 Paterson, Thos., W.S., 81A George Street
 1890 Patten, Hugh, W.S., 42 Castle Street
 1880 Paul, George M., C.S., 16 St Andrew Sq.
 1884 Pearson, A. G., of Luca, 5 Rothesay Pl.
 1878 Pendreigh, George, Catcuna, Gorebridge
 1871 Petrie, S. F., 350 Leith Walk
 1869 Pitman, Frederick, W.S., 11 Great Stuart Street
 1859 Plenderleith, Arch., Blackhope, Heriot
 1860 Plummer, J., 15 Greenhill Terrace
 1880 Pott, George, of Potburn, 55 Albany St.
 1865 Prentice, R. R., 6 Mayfield Terrace
 1863 Pringle, D., Turquhan, Stow
 1876 Pringle, J., 5 Tipperlinn Road
 1877 Pringle, Wm., Huntly Cot., Gorebridge
 1889 Raeburn, Norman, 40 Manor Place—*Free Life Member*
 1881 Ramsay, R. G. Wardlaw, of Whitehill, Rosewell
 1890 Ramsay, William, of Bowland, Stow
 1874 Rankine, Prof. John, 23 Ainslie Place
 1887 Readman, J. B., 17 Heriot Row
 1893 Reid, James, W.S., Drem, East Lothian (2 Thistle Court)
 1883 Reid, R. C., C.E., 72 George Street
 1888 Renwick, Andrew, East Filton, Edinburgh
 1879 Renwick, Wm., Meadowfield, Corstonphine
 1885 Rew, William, 4 Bernard Street, Leith
 1884 Richard, John Millar, 20 Grosvenor Cres.
 1877 Riddell, A., 5 Grassmarket
 1854 Riddell, Thos., Ramsay Villa, Musselburgh
 1869 Ritchie, Charles, S.S.C., 20 Hill Street
 1877 Ritchie, D., 13 Windsor Street
 1865 Ritchie, W., of Middleton, Gorebridge
 1853 Ritchie, W., Woolmet, Dalkeith
 1854 Robertson, J. A., C.A., 38 Charlotte Sq.
 1876 Robertson, Lieut.-Col. James C., United Service Club
 1889 ROBERTSON, Rt. Hon. J. P. B., Lord Justice-General, 19 Drumshugh Gardens
 1898 RUSSELL, James Alex., Lord Provost of Edinburgh

Admitted

- 1800 Rutherford, G., Monteath's Houses, Gorebridge
 1887 Rutherford, Richard, V.S., Bread Street
 1880 St Clair, J. S., 90 High Street, Musselburgh
 1864 Sanderson, Wm., Mount Lothian, Eskbank
 1892 Sanford, Major Charles Henry, Beeslack, Milton Bridge
 1854 Soon, K., 46 Rankellor Street
 1875 Scott, Alex., 3 Bellfield, Portobello
 1876 Scott, A. T. S., 1 Hill Street
 1891 Scott, Rev. Arch., D.D., 16 Rothesay Place—*Chaplain to the Society*
 1880 Scott, E. E., C.A., 64 Queen Street
 1861 Scott, Lord Walter, Dalkeith
 1848 Seton, George, Edinburgh
 1870 Shand, John, M.D., 84 Albany Street
 1859 Shiells, James, Muhihouse, Stow
 1860 Simpson, Alex., Wallyford, Musselburgh
 1887 Simpson, James, Ingliston, Ratho
 1878 Simpson, Thomas, Duddingston, Portobello
 1874 Simson, C. S., 47 Queen Street
 1860 Skinner, W., of Corra, W.S., 35 George Square
 1846 Skirving, R. Scot, 29 Drummond Place
 1886 Skirving, Thos. M., Niddrie Mains, Liberton
 1889 Slimon, Robert, of Whitburgh, Ford, Dalkeith
 1877 Small, James, Commercial Bank, Edinburgh
 1884 Smart, Alex., Bow, Stow.
 1864 Smart, Jas., Liberton Park, Liberton
 1880 Smart, J. C., 54 George Square
 1881 Smith, A. D., C.A., 29 St Andrew Sq.
 1878 Smith, J., 89 Grassmarket
 1867 Smith, J. Turnbull, C.A., 5 Belgrave Place
 1884 Smith, Thomas H., National Bank, Edinburgh
 1854 Starforth, John, Architect, 37 York Pl.
 1870 Steel, Lieut.-Col. G. Mure, 10 Palmerston Place
 1874 Steell, Gourlay, R.S.A., 4 Palmerston Place
 1861 Stenhouse, Jas., Turnhouse, Cramond Bridge
 1888 Stenhouse, John, jun., 13 Blacket Place
 1864 Steuart, James, Dalkeith Park, Dalkeith
 1884 Steuart, J. H., Selma, Kirknewton
 1893 Steuart, Thomas Ellis, Stollknowe, Leadburn, and 48 Palmerston Place
 1855 Stevenson, Andrew, 18 Royal Circus
 1886 Stevenson, David Alan, C.E., 84 George Street
 1887 Stewart, J. C., 30 Heriot Row
 1893 Stewart, James Robert Hunter, 4 Albion Place
 1878 Stodart, J. A., Broomvale, Broomieknowe, Lasswade
 1851 Stodart, John, Calderwood Bank, Lasswade
 1890 Stoddart, James Edward, of Howden, Mid-Calder
 1878 Strathern, Robt., W.S., 13 South Charlotte Street
 1853 Sutherland, Eric, Enfield, Lasswade
 1865 Sutherland, Jas. B., S.S.C., 10 Windsor Street
 1858 Swan, James, 47 Lauriston Place
 1858 Swan, Thomas, 47 Lauriston Place
 1889 Sydeserff, John Buchan (Ruchlaw), National Bank, 142 Princes Street
 1874 Syme, David, 1 George IV. Bridge
 1876 Syme, James, New Club, Edinburgh
 1876 Symington, Jas., 55 Fountainhall Road
 1868 Taylor, Alex., Pathhead, Ford

Admitted

- 1884 Taylor, Peter, Lochend
 1873 Taylor, Thos., Seed Merchant, Dalkeith
 1878 Thiem, Albert M., Windsor Hotel, Princes Street
 1884 Thin, John, Ferniehiirst, Stow
 1874 Thoma, Geo. Hunter, 13 Charlotte Square
 1830 Thomson, Andrew, 15 Inverleith Place
 1867 Thomson, Charles W., C.A., 16 Lennox Street
 1889 Thomson, George Munro, W.S., 1 Drumshugh Place
 1858 Thomson, James, 58 George Street
 1867 Thomson, John Comrie, 30 Moray Place
 1870 Thomson, Lockhart, S.S.C., 114 George Street
 1873 Thomson, Mitchell, 12 Queen Street
 1859 Thomson, Peter, Conservative Club, Princes Street
 1888 Thomson, Robert, Rusha, West Calder
 1872 Thomson, W. A., 18 Dock Street, Leith
 1884 Thorburn, David, Brockhouse, Stow
 1872 Thyne, John, 5 Dean Terrace
 1860 Tod, James C., Currie
 1870 Tod, John W., W.S., 66 Queen Street
 1876 Todd, David, 2 Dick Place
 1866 Todd, Jas., 2 Morningside Gardens
 1871 Torrance, Archibald P., Kippielaw, Dalkeith
 1877 Torrance, T. A., Camps, Wilkieston
 1872 Torrance, W., Camps Linn Works, Wilkieston
 1876 Traill, Thomas, Inverleith Terrace
 1840 Traquair, Ramsay H., Colinton
 1865 Trotter, Counts, 17 Charlotte Square
 1865 Trotter, Lieut.-Col. H., of Morton Hall, Liberton
 1860 Trotter, Lieut.-Col. R. A., of the Bush, Roslin
 1878 Tuke, Dr J. B., Saughton Hall
 1874 Turnbull, David, W.S., 5 South Charlotte Street
 1868 TURNER, Prof. Sir W., M.B., 6 Eton Terrace
 1885 Usher, John, of Norton, Ratho
 1804 Veitch, Chris., 11 Rothesay Place
 1874 Waddell, A. Peddie, 6 Albany Place
 1888 Waddell, George, 4 St Andrew Square
 1857 Wakelin, John, Oil Mills, Musselburgh
 1877 Walcott, John, 13 Greenside Place
 1870 Walker, Alexander, Stagehank, Heriot
 1873 Walker, Alex. J., 5 Manor Place
 1860 Walker, James, of Dalry, Hanley, Corstorphine
 1882 Walker, R. H., of Hartwood, West Calder
 1884 Walker, James, Linnfield House, West Calder
 1835 WALKER, Sir W.S., K.C.B., 5 Manor Place
 1803 Wallace, John William, of Shoestanes (3 Bernard Street, Leith)
 1878 Wallace, Prof. Robert, University, Edinburgh—Free Life Member
 1885 Wallace, S. W., Brunstane House, Joppa
 1872 Walley, Thos., Principal, Veterinary College, Clyde Street
 1868 WARRENDER, Sir G., of Lochend, Bart., Bruntisfield House
 1837 Waterston, Charles, 39 Albany Street
 1869 Watherston, James, 29 Queensferry St.
 1869 Watherston, Wm., 29 Queensferry Street
 1882 Watson, G. G., W.S., 45 Charlotte Sq.
 1878 Watson, Jas. Graham, 22 Learmonth Ter.
 1884 Wauchope, Lieut.-Colonel A. S., of Nidrie Marischall, Liberton
 1842 WAUCHOPE, Sir John Don, of Edmonstone, Bart., 11 Ainslie Place
 1882 Wauchope, J. D. D., yr. of Edmonstone, 11 Ainslie Place
 1868 Webster, J., 12 Brunstane Road, Portobello

Admitted

- 1886 Welsh, W. M., 1 Waterloo Place
 1877 Welwood, J. A. Maconochie, Meadowbank House, Kirknewton
 1884 Wenley, James A., Bank of Scotland
 1876 White, James, Stagehall, Stow
 1872 White, Robert, Outerston, Gorebridge
 1884 Wight, Robert, Suffolk House, Suffolk Road
 1884 Wilkie, Captain W., of Ormiston, Kirknewton
 1873 Will, Robert W., S.S.C., 87 Queen Street
 1867 Williams, W., Principal, New Veterinary College, Leith Walk
 1881 Williams, W. O., New Veterinary College, Leith Walk
 1893 Williamson, Alex., West Edge, Liberton
 1882 Wilson, Dr Alex., Ashville, Mid-Caldor
 1878 Wilson, John, of Alderton, Mid-Caldor
 1892 Wilson, John Hardie, D.Sc., F.R.S.E., Royal Botanic Garden—Free Life Member
 1858 Wilson, Richard, C.A., 28 Great King St.
 1877 Wishart, D. F., 18 Picardy Place
 1850 Wright, David, Ravenswood, South Oswald Road
 1875 Wylie, Alexander, W.S., 54 Queen St.
 1890 Wylie, James, Royal Bank, Leven St., Edinburgh
 1854 Young, Hon. Lord, 28 Moray Place
 1888 Young, David, 377 High Street
 1876 Young, John, St Margaret's, Wester Duddingston
 1899 Young, J. W., W.S., 32 Royal Circus
 1837 Younger, George, 15 Carlton Terrace
 1870 Younger, Henry J., Abbey Brewery
 1803 Younger, Robert, 15 Carlton Terrace

HADDINGTON.

- 1882 Ainslie, John, jun., Morham Mains, Haddington
 1877 Anderson, Col., of Bourhouse, Dunbar
 1859 Anderson, G. B., Melkie Pinkerton, Dunbar
 1873 Anderson, W. W., of Kingston, North Berwick
 1881 Andrew, H., Lennoxlove Acredales, Haddington
 1892 Bailhe, Wm., Nurseries, Haddington—Free Life Member
 1860 BAIRD, Sir David, of Newbyth, Bart., Prestonkirk
 1803 BALFOUR, Right Hon. A. J., of Whittinghame, M.P., Prestonkirk
 1888 Bayley, Isaac F., Halls, Dunbar
 1859 Binnie, John, Birnieknowes, Cockburnspath
 1802 Blair, Thomas, Hoprig Mains, Macmerry
 1872 Brand, James, Dunbar
 1880 Bridges, Andrew, Engineer, North Berwick
 1868 Broadwood, T., Crowhill, Dunbar
 1843 Brodie, Jas. C., Thorntonloch, Dunbar
 1880 Bruce, John, Newlands, Haddington
 1884 Calder, Robt., Cairnridinies, Haddington
 1871 Campbell, George, Rhodes, North Berwick
 1884 Caverhill, A. M., Crichtness, Duns
 1859 Clapperton, James, Garvald Mains, Prestonkirk
 1864 Clark, James, Kirklandhill, Dunbar
 1880 Clark, Thomas, Oldhamstocks Mains, Cockburnspath
 1889 Connor, G. A., Craigielaw, Longniddry
 1886 Courtney, Wm., Portobello Farm, Trenchant
 1801 Crosbie, Alexander, Blegbie, Humble
 1887 Deans, John, East Fenton, Drem
 1877 DENMAN, Lord, Alderston, Haddington

Admitted

- 1872 Dewar, David, Murrays, Ormiston
 1877 Dods, Samuel, Sommerfield, Haddington
 1877 Donald, Andrew, Longnewton, Gifford, Haddington
 1864 Drysdale, Henry, Begbie, Haddington
 1884 Durie, John, Tranent
 1884 Ercro, Lord, M.P., Gosford, Longniddry
 1881 Elder, Hugh, East Bearford, Haddington
 1890 Elder, James, Haddington
 1890 Elder, Thomas, Stevenson Mains, Haddington
 1884 Elliot, Walter, Piteox, Dunbar
 1875 Ewart, H., Tynninghame, Prestonkirk
 1857 Fletcher, J., of Salton, Tranent
 1840 Ford, Wm., Fenton Barns, Drem
 1877 Fyshe, Peter, Newtonlees, Dunbar
 1859 Gankroger, G., Southfield, Longniddry
 1883 Gemmell, Wm., Greendykes, Macmerry
 1889 Gillespie, William, Athelstaneford, Drem
 1855 Gray, Wm., Brownrigg, North Berwick
 1882 Gray, W. W., of Nunraw, Prestonkirk
 1878 Greenshields, T. A., Windymains, Salton
 1857† HADDINGTON, The Earl of, Tynninghame, Prestonkirk
 1892 Haldane, Fred., Phantassie, Prestonkirk
 1859 Haldane, Robt., Phantassie, Prestonkirk
 1878 HALL, Sir Basil F., of Dunglass, Bart., Cockburnspath
 1872 Handyside, J. B., Fenton, Drem
 1862 Hay, Captain J. G. Baird, of Belton, Dunbar
 1885 Henderson, George, Upper Keith
 1887 HEPBURN, Sir T. B., of Smeaton, Bart., Prestonkirk
 1886 Hope, Harry, Oxwell Mains, Dunbar
 1866 Hope, Henry W., of Luffness, Drem
 1847 Hope, James, East Barns, Dunbar
 1878 Hope, William James, East Barns, Dunbar
 1877 Houston, M. H., of Beechhill, Haddington
 1840 Hume, P. H., Dunbar
 1887 Hunter, Richard, of Thurston, Dunbar
 1842 Innes, T. S. Mitchell, of Phantassie, Prestonkirk
 1877 Johnston, Alex., North Mains, Ormiston
 1803 Kerr, William Walker, Ferrygate, Drem
 1873 King, William, jun., Wolfstar, Ormiston
 1859 KINLOCH, Sir Alexander, of Gilmerton, Bart., Drem
 1885 Kinloch, David A., yr. of Gilmerton, Guards' Club, London
 1878 Lawrie, Jas. D., of Monkkrigg, Haddington
 1889 Lawson, James Grey F., Beltonford, Dunbar
 1870 M'Culloch, D., Bank Agent, North Berwick
 1864 M'Ewen, J., Redside Farm, North Berwick
 1887 M'Nab, Wm., Northrigg, Haddington
 1877 Mark, John, Sunnyside, Prestonkirk
 1889 Murray, Rev. W. B., Morham Manse, Haddington
 1871 Nelson, Charles, Skateraw, Innerwick
 1865 Newton, Captain Hay, of Newton Hall, Haddington
 1889 Ogilvy, H. T. N. Hamilton, Biel, Prestonkirk
 1866 Park, Thos. B., Springfield, Haddington
 1889 Park, Wm. R., of Blegbie, Upper Keith
 1865 Panton, F. H., Aberlady Mains, Longniddry
 1868 Richardson, J., Hilton Cottage, Haddington
 1868 Riddell, Wm., Cocklaw, Haddington
 1873 Robertson, James F., Newhouse, Drem
 1872 Robertson, Robt., West Barns, Dunbar

Admitted

- 1874 Robson, John, Millknowe Cranshaws, Duns (Newton, Bellingham)
 1886 Scott, Alex., Summerfield, Dunbar
 1883 Scott, G. R., Commercial Bank, Dunbar
 1878 Sharp, John J., Ewingston, Gifford—*Free Life Member*
 1877 Shields, James, Dolphington, Tranent
 1847 Shirriff, David, Muirton, Drem
 1850 Shirriff, Samuel D., North Berwick
 1868 Smith, Andrew, Longniddry
 1853 Smith, Chas., Whittinghame, Prestonkirk
 1876 Smith, D. W. E., North Elphinstone, Tranent
 1882 Smith, E. Hedley, Whittinghame, Prestonkirk—*Free Life Member*
 1855 Stodart, William, Wintonhill, Tranent
 1863 Stuart, A. C., of Eaglescarnie, Haddington
 1862 Swinton, P. Burn, Holyn Bank, Gifford
 1858 Sydserff, T. Buchan, of Ruchlaw, Prestonkirk
 1855 Taylor, J. B., Seton West Mains, Prestonpans
 1859 Turnbull, P., Little Pinkerton, Dunbar
 1877 Turnbull, Walter, Tynemont, Ormiston
 1879 TWEEDDALE, The Marquis of, Yester, Haddington
 1859 Tweedie, Alexander, Coats, Haddington
 1881 Wallace, John, Hailes, Haddington
 1888 Watt, Miss Adelaide, of Spott, Dunbar
 1850 Welsh, Alexander, Waughton, Prestonkirk
 1847† WEMYSS and MARCH, The Earl of, Gosford, Longniddry
 1888 Wilson, Peter, Rhodes, North Berwick
 1885 Wylie, N. M., New Club, North Berwick
 1884 Wyllie, Alex., Thurston Mains, Dunbar
 1877 Young, D. S., Bonnington, North Berwick
 1887 Young, James B., Elphinstone Tower, Tranent
 1869 Yule, Edward, Balgone, North Berwick

LINLITHGOW.

- 1874 Allan, J., Corn Merchant, Bo'ness
 1875 Allan, James, jun., Bo'ness
 1855 Bartholomew, J., Craigton House, Winchburgh
 1883 Bartholomew, John, Duntarvie, Winchburgh
 1857 Bett, James, of Kaim Park, Bathgate
 1858 Borthwick, John, V.S., Kirkliston
 1855 Brash, James, Hallyards, Kirkliston
 1870 Brock, J. E., Overton, Kirkliston
 1885 Brownlee, George, Cousland, Bathgate
 1875 Brownlee, James, East Whitburn Farm
 1865 Bryce, James, East Whitburn, Whitburn
 1869 Cadzow, J., Bangour, Uphall
 1873 Chapman, James, Balencriff Mill, Bathgate
 1881 Drysdale, And. L., The Leuchold, Dalmeny Park, Edinburgh
 1870 Dudgeon, Alex., Humble, Kirkliston
 1869 Dudgeon, George, Almondhill, Kirkliston
 1887 Dudgeon, Jn. G., Easter Dalmeny, Dalmeny
 1889 Ferrier, Wm. C., Birkenshaw, Bathgate
 1868 Fleming, George, Haugh, Kirkliston
 1855 Gardner, Robert, Whitburn
 1869 Glendinning, Alex., New Mains, Kirkliston
 1876 Graham, William, Wheatlands, Cramond Bridge
 1850 Hill, John, Carlowie, Cramond Bridge
 1860 Hog, Thos. A., of Newliston, Kirkliston
 1887 Hope, Capt. Thos., of Bridge Castle, Bathgate

Admitted

- 1884† Hopetoun, The Earl of, Hopetoun House,
South Queensferry
1892 Hutchison, Thomas, of Carlowrie, Kirk-
liston
1886 Johnston, John, Banker, Bathgate
1868 Law, James, East Mains, Broxburn
1880 Learmonth, G. Gray, North Bank,
Bo'ness
1863 Leslie, James, Boghall, Linlithgow
1889 Macaulay, Jas. F., Kinneil Estate Office,
Bo'ness
1860 M'Kinlay, John, Hardhill, Bathgate
1847 M'Lagan, Peter, of Pumphreston, M.P.,
Calder Hall, Mid-Calder
1883 MacNab, John, Glenmavis, Bathgate
1879 Masson, Rev. Alex., The Manse, Kirk-
liston
1867 Meikle, John, Grougfoot, Linlithgow
1879 Meikle, William, East Bonhard, Lin-
lithgow
1886 Melville, G. F., Sheriff-Substitute, Lin-
lithgow
1877 Mitchell, Geo., Broxburn Park, Broxburn

Admitted

- 1886 Mitchell, Wm., Dechmont, Uphall
1860 Morrison, J., West Dalmeny, Dalmeny
1891 Murray, John, Bridgehouse, Bathgate—
Fies Life Member
1888 Nimmo, Thos., Kirklands, Winchburgh
1873 Orr, James, Hill, Whitburn
1868† Roseberry, The Earl of, Dalmeny Park,
Edinburgh
1889 Rough, Robert L. (R. Rough & Sons),
Broxburn
1882 Russel, James, Dundas Castle, Queens-
ferry
1886 Russell, Alex., of Mossie, Bathgate
1889 Russell, Thomas, Greenhill, Avonbridge
1887 Shields, John, Auctioneer, Linlithgow
1864 Steuart, Captain R., of Westwood, West
Calder
1881 Stewart, G. M. F., of Binny, Linlithgow
1888 Tod, Wm., Pardovan, Philipstoun, Lin-
lithgowshire
1893 Veitch, W. H., Dalmeny Park, Edin-
burgh
1889 Walker, Thos. Geo., Kilpant, Broxburn

5.—ABERDEEN DISTRICT.

EMBRACING THE

COUNTIES OF ABERDEEN, BANFF, FORFAR (EASTERN
DIVISION), AND KINCARDINE.

ABERDEEN.

Admitted

- 1372 HER MOST GRACIOUS MAJESTY THE
QUEEN
1373* HIS ROYAL HIGHNESS THE PRINCE OF
WALES
1363† ABERDEEN, The Earl of, Haddo House,
Methlick
1385 Abernethy, David W., Ferryhill Foundry,
Aberdeen
1384 Adam, Alexander, 20 Union Terrace,
Aberdeen
1376 Adam, Thos., National Bank, Aberdeen
1390 Adam, Walter, Corskellie, Huntly
1376 Ainslie, Ainslie Douglas, of Delgaty
Castle, Turriff
1375 Ainslie, Wm., Pitfour, Mintlaw
1376 Alexander, George, South Balnoon,
Huntly
1389 Allan, John, Aikenshill, Culter Cullen,
Aberdeen
1385 Anderson, George, West Fingask, Old
Meldrum
1357 Anderson, John, Craigton, Banchory
1368 Anderson, John, Mill of Wester Coull,
Tarland
1376 Anderson, John M., Huntly
1381 Anderson, Robt., Wester Coull, Tarland
1376 Anderson, William, Warles, Kintore
1376 Anderson, Wm., Wellhouse, Alford
1385 Angus, Samuel, Bonnymuir, Aberdeen
1382 Argo, James, Cairdseat, Utny, Aberdeen
1385 Bain, George, Old Mill Reformatory,
Aberdeen
1358 Barclay, C. A., Aberdour House, Fraser-
burgh
1362 Barclay, J. W., M.P., 60 Dee Street,
Aberdeen
1385 Barclay, Morrison, 60 Dee Street, Aber-
deen
1384 Barron, Geo. F., Melkie Endovie, Alford,
N.B.
1388 Baxter, Andrew, Lime Co., Aberdeen
1376 Bean, Alex., Sunnyside, Rothienorman
1376 Bean, George, Balquhain, Inverurie
1385 Bean, James, Mains of Dumbreck, Udney
1382 Beaton, James, Burnside of Delgaty,
Turriff
1385 Beaton, John, Station Hotel, Inch
1376 Beedie, James, The Mains, Ardlaw,
Fraserburgh
1376 Bell, John, Tyrie Mains, Fraserburgh
1388 Bennet, L., Crookednook, Longside
1388 Benton, William, Harthill, Whitehouse
1385 Black, James, Barthol Chapel, Old
Meldrum
1393 Booth, Matthew, Mastrick Stocket, Aber-
deen
1384 Bothwell, Wm., Berryhill, Bridge of Don,
Aberdeen

Admitted

- 1379 Bowman, James, Square, Huntly
1392 Brown, James, Elrich, Alford, N.B.
1386 Brown, James H., Banker, Ellon
1384 Brown, John, Craigie Cottage, Hardgate
Aberdeen
1383 Brown, Joseph, Little Endovie, Alford
1308 Bruce, George, Heatherwick, Keith Hall
1376 Bruce, James, Collithie, Gartly
1368 Bruce, James, Inverquhomery, Mintlaw
1376 Bruce, Peter, Myreton, Inch, Aberdeen
1375 Burr, Alexander, Tulloford, Old Meldrum
1377 Burr, John M., Netherton, Fyvie, Aber-
deen
1376 Campbell, Silvester, Tofthills, Aberdeen
1364 Chalmers, William, Potterton, Bridge of
Don, Aberdeen
1388 Chapman, Alex., Slack-a-dale, Turriff
1373 Charles, John, Town and County Bank,
Inverurie
1369 CLARK, Sir John F., of Tillypronie, Bart.,
Tarland
1373 Clarke, William, Hopewell, Tarland
1358 Cochran, James, Waterside Lodge, New-
burgh
1386 Collie, Wm., Priestwalls, Inch
1371 Cook, Charles, Cardan House, Aber-
deen
1370 Copland, Alex., Commercial Co., Aber-
deen
1391 Copland, Robt., Milton, Ardlathen, Ellon
1340 Cordner, W. F., Mormond House, Cortes
1369 Coupar, J. C., of Craigiebuckler, Aber-
deen
1368 Cowie, Alex., jun., Turtory, Huntly
1384 Cowie, Alex., Ythan Cottage, Ellon
1387 Craib, Dd., New Aberlony, Fraserburgh
1373 Cran, George, Old Morlich, Inverkindie
1376 Cran, James, jun., Knockando, White-
house
1358 Cruickshank, Amos, Sittyton, Aberdeen
1368 Cruickshank, Andrew, 37 Gordon Street,
Huntly
1376 Cruickshank, J., Ladysford, Fraserburgh
1376 Cruickshank, J. W., Elrick House, Sum-
nerhill, Aberdeen
1376 Dakers, James, 24 Union Row, Aberdeen
1386 Darling, D. C., 11 Bridge St., Aberdeen
1386 Dawson, W. F. G., North of Scotland
Bank, Inch
1382 Dewar, Alexander, Bethlin, Midmar,
Aberdeen
1368 Donald, James, Whitemyres House, Old
Skene Road, Aberdeen
1392 Duff, Archibald, of Annfield, Aberdeen
1368 Duff, Col. James, Knockleith, Turriff
1384 Duff, G. A., of Hatton, Turriff
1358 Duguid, P., of Cammachmore, Aberdeen
1386 Duncan, Alexander, Bridge of Dee,
Aberdeen
1377 Duncan, John, Fortrie, King Edward

Admitted

- 1877 Duncan, Patrick, Balchers, King Edward
 1878 Durno, James, Jackson, Rothenorman
 1888 Durno, John, Lambhill, Inch
 1885 Durno, Leslie, Mains of Glack, Old Meldrum
 1801 Durward, Robert, Bieblack, Coldstone, Dinnet
 1868 Duthie, William, Banker, Tarves
 1865 Farquharson, J., 1 Abbotsford Place, Aberdeen
 1872 Ferguson, Lieut.-Col. George A., of Pitfour, Mintlaw
 1885 Ferguson, Geo. A., Lessendrum, Drumblade
 1808 Ferguson, Thomas, 46 Don Street, Old Aberdeen
 1870 Ferguson, William, of Kinmundy, Aberdeen (41 Manor Place, Edinburgh)
 1865 Foggo, R. G., Invercauld Office, Ballater
 1872 Forbes, Right Hon. Lord, Castle Forbes, Koig
 1802 Forbes, The Hon. J. O., of Corse, Lumphphan
 1874 Forbes, James, Tombreck, Glenbucket
 1842 Forbes, General Sir John, of Invernan, K.O.B., Strathdon
 1885 Forbes, William, Ruthven, Dinnet
 1874 Fowler, William, of Aslead, Methlick
 1885 Fowlie, James, Brunchill, New Deer
 1872 France, C. S., 11 Bridge Street, Aberdeen
 1800 Fraser, Col. Fred. Mackenzie, of Castle Fraser, Aberdeen
 1885 Fraser, George, Hill of Skillmaill, Ellon
 1892 Fraser, Wm. N., of Findrack, Torphins
 1874 Garden, Robert, Mains of Tolquhon, Tarves
 1857 Garden, William, Strichen, Aberdeen
 1882 Garioch, Peter, 1 Stirling St., Aberdeen
 1882 Garvie, R. G. (Ben. Reid & Co.), Aberdeen
 1886 Geddes, Alex., of Blairmore, Glass, Huntly
 1876 Gibson, H. J., 19 Silver Street, Aberdeen
 1885 Gordon, Alex., of Pitlurg and Dyce, Parkhill House, Aberdeen
 1876 Gordon, A. M., of Newton, Inch
 1876 Gordon, Henry, of Manar, Inverurie
 1886 Gordon, Henry G. Fellowes, of Knoockspock, Clatt
 1868 Gordon, H. W., of Hallhead, Ellon
 1889 Gordon, Robert, Gordonston, Clatt, Kennethmont—*Free Life Member*
 1876 Gordon, William, Auchallater, Braemar
 1880 GRANT, Sir Arthur, of Monymusk, Bart.
 1870 Grant, John, Banker, Methlick
 1841 Grant, Robert, of Druminnor, Rhynie
 1829 Grassick, John, 21 Ferryhill Place, Aberdeen
 1800 Halkien, Gavin, Dalmuinzie, Murtle
 1804 Halkett, Jas., Auchontender, Inch
 1876 Hall, Alex. H., Campfield, Banchory
 1885 Harper, Hugh (Harper & Co.), Aberdeen
 1870 Harvey, G. T., 63 Union Street, Aberdeen
 1854 Harvey, J. H., Pitgersie, Foveran, Ellon
 1885 Hay, Alexander (Ben. Reid & Co.), Guild Street, Aberdeen
 1862 Hay, Col. A. S. L., of Rannes, C.B., Kennethmont
 1868 Hay, James, jun., Little Ythie, Tarves
 1887 Hay, John, of Millmoss, Turriff
 1892 Huggan, John A., 85 Market St., Aberdeen
 1876 Hunter, Capt. A. C., of Tillery and Auchiries, Aberdeen
 1884 Hunter, Charles, Upper Mills of Drum, Orathes

Admitted

- 1872 HUNTLY, The Marquis of, Aboyne Castle, Aboyne
 1884 Hutcheon, Alex., Nether Ordley, Auchterless, Turriff
 1886 Hutcheon, Major John, Lower Cotburn, Turriff
 1887 Hutcheon, John, of Upperton, Gask House, Turriff
 1800 Innes, Lt.-Colonel Francis Newel, R.N., R.A., yr. of Learney, Torphins
 1840 Innes, Col. Thos., of Learney, Aberdeen
 1862 Innes, T. G. Rose, of Netherdale, Turriff
 1869 Ironside, William, Cloftrickford, Ellon
 1876 Jeffrey, Arthur, Tillyfour, Whitehouse
 1876 Johnstone, J., Drunwhindle Mains, Ellon
 1876 Keith, Alexander, Chapelton, Ellon
 1876 Kilgour, Robert, jun., Ardlin, Ellon
 1876 Law, Jn., New Keig, Whitehouse, Aberdeen
 1885 Law, John, Lochend, Old Meldrum
 1871 Lawson, Charles, Deebank, Cuits
 1868 Lawson, C., Ordhead, Cluny, Aberdeen
 1876 Ledingham, A., Balnoon Cottage, Forgue, Huntly
 1885 Ledingham, John, Fintry, Turriff
 1889 Ledingham, J. K., North Flaidy, Turriff—*Free Life Member*
 1890 Leith, A. J. Forbes, of Fyvie Castle, Fyvie
 1860 Leith, Major Thomas, Petmathen, Oyne
 1885 Leslie, David, Lochhills, New Machar
 1885 Leslie, G. Arbuthnot, of Warthill, Aberdeen
 1884 Leys, James, Asloun, Alford
 1892 Littlejohn, Geo., Wellhouse, Alford, N.B.
 1857 Lovie, Alex., Nether Boydnie, Fraserburgh
 1877 Lumsden, Gen. Sir H. B., Belhelvie Lodge, Aberdeen
 1860 Lumsden, Henry, of Pitcaple, Pitcaple
 1877 Lumsden, H. G., of Auchindoir, Aberdeen
 1876 Lumsden, W. H., of Balmedie, Aberdeen
 1884 Lyon, John, Peterwall, Fyvie
 1858 M'Connach, Chas., Cairnballoch, Alford
 1888 Macdonald, R., Cluny Castle, Aberdeen
 1884 M'Intosh, Jas., 50 Market Buildings, Aberdeen
 1880 MACKENZIE, Sir A. R., of Glenmuick, Bart., Braikie House, Ballater
 1869 Mackie, James, Lewes, Fyvie
 1871 Mackie, William, Petty, Fyvie
 1869 Mackinnon, L., jun., Advocate, Aberdeen
 1887 M'Lean, Neil, of Breda, Alford, N.B.
 1889 Macpherson, And., Gibston, Huntly
 1888 M'Robbie, Alex., Sunnyside, Aberdeen
 1891 M'Robbie, John S., Sunnyside, Aberdeen
 1884 Maitland, John, Easter Balhagardy, Inverurie
 1875 Maitland, Robt., Balhagardy, Inverurie
 1876 Marr, John, Cairnbrogie, Old Meldrum
 1855 Marr, Wm. Smith, Upper Mill, Tarves
 1843 Marr, W. S., jun., Upper Mill, Tarves
 1885 Matthews, Jas., 255 Union Street, Aberdeen
 1875 Mearns, Rev. Duncan G., Oyne Manse Aberdeenshire
 1802 Mennie, A. M'G., Brawlandknowes, Gartly
 1875 Merson, James, Craigwillie, Huntly
 1876 Middleton, Alex., Belmont, Aberdeen
 1855 Milne, Alex., Victoria Cottage, Dyce
 1891 Milne, James, Gateside, Old Meldrum
 1856 Milne, J., Netherton of Pittendrum, Fraserburgh
 1867 Milne, John, Inverurie—*Free Life Member*, 1878
 1887 Milne, Robt., Corse of Kinnaird, Huntly
 1876 Mitchell, Alex., Balgreen, King Edward

Admitted

- 1885 Mitchell, James, Caies Mill, Kinaldie
 1876 Mitchell, Wm., Mains of Biffie, Old Deer
 1868 Mitchell, Wm. A., Auchinagathel, Keig
 1881 Moffat, Wm., Great N. of S. Railway, Aberdeen
 1886 Moir, Alexander, Woodside, Aberdeen
 1885 Moir, Robert, Tarty, Ellon
 1871 Morris, W., V.S., 7 Langstane Place, Aberdeen
 1885 Morrison, Andrew, Upper Cotburn, Turriff
 1870 Morrison, John, jun., Hattonslap, Tarves, Old Meldrum
 1885 Morrison, John, Knockiemill, Turriff
 1872 Muirhead, George, Haddo House Mains, Aberdeen
 1879 Murray, James, Fauchfaulds, Turriff
 1872 Nares, A. F., Parkhill, Aberdeen
 1869 Nicol, W. E., of Ballogie, Aboyne
 1885 Nicol, Wm., Ordhead, Cluny, Aberdeen
 1882 Norrie, Wm., Cairnhill, Monquhitter, Turriff—Free Life Member
 1882 Ogston, Alex. M., of Ardoo, Aberdeen
 1882 Paull, James, Advocate, Aberdeen
 1886 Philip, George, Boynds, Inverurie
 1859 Pittendrigh, A., Mains of Park, Lomnay
 1868 Profeit, Dr, Craigowan Cottage, Balmoral
 1882 Rae, John, jun., Corn Merchant, Ellon
 1882 Rae, Wm., Advocate, Aberdeen
 1866 Ramsay, Col. John, of Barra, Straloch, Aberdeen
 1891 Reid, David, Crofts of Glenmuick, Ballater
 1877 Reid, Dr James, Templeton, Mossat
 1858 Reid, James, Greystone, Alford
 1876 Reid, James, Horse Bazaar, Peterhead
 1884 Reid, John, Balquharn, Alford, N.B.
 1884 Reid, W. R., 187 Union Street, Aberdeen
 1885 Reid, Wm., 8 Haddon Street, Aberdeen
 1876 Reith, Robert, Middlefield, Woodside, Aberdeen
 1876 Robertson, Duncan, Sheriff of Aberdeen
 1885 Robson, Alex. (W. Smith & Sons), Aberdeen
 1885 Ronald, James, Pithee, Pitcaple
 1885 Ross, Alex., Nether Park, Drumoak
 1888 Ross, H., care of the Secretary, Mutual Improvement Association, Tarland
 1848 Ross, John Leith, of Arnage, Ellon
 1871 Ross, Peter, Arngrove, Torphins
 1871 Ross, Wm., Annesley, Torphins
 1885 Runchman, James, Castleton, King Edward
 1885 Runciman, John, Auchmull, King Edward
 1854 Ruxton, Andrew, South Arbrochie, Ellon
 1868 Salmon, E., 269 Great Western Road, Aberdeen
 1886 SALTOUN, Right Hon. Lord, Philorth House, Fraserburgh
 1881 Scott, Ronald, 286 Great Western Road, Aberdeen
 1857 Scott, W., Urquhart Road, Old Meldrum
 1885 Sellar, R. H. N., Implement Maker, Huntly
 1857 SEXPILE, Right Hon. Lord, Fintray House, Aberdeen
 1868 Shaw James, Tillyehing, Lumphannan
 1865 Shepherd, George, Shethin, Tarves
 1860 Sim, Alex., 1 Market Street, Aberdeen
 1885 Simpson, John, Implement Maker, Peterhead
 1856 Skinner, James, Woodside, Aberdeen
 1889 Skirving, Robert, of Colbairdy, Huntly
 1885 Sleigh, John, Strichen Mains, Strichen
 1885 Smith, Arthur, Oakbank Cottage, Kingsgate, Aberdeen
 1885 Smith, James, Burnshangle, Strichen

Admitted

- 1885 Smith, J. S., Northern Agricultural Company, Aberdeen
 1888 Stephen, James, Conglass, Inverurie
 1889 Stewart, David, of Banchory, Banchory House, Aberdeen
 1857 Stewart, Samuel, 36 Osborne Place, Aberdeen
 1885 Still, Alexander W., Nether Anguston, Peterculter
 1885 Still, Geo., Strathray, Kinneller, Blackburn, Aberdeen
 1883 Strachan, Alex., Wester Fowlis, Alford
 1878 Strachan, Charles, Tillyorn, Tarland
 1858 Strachan, Lewis, Cluny of Raemoir, Banchory
 1885 Stuart, Alexander, of Laithers, Turriff
 1885 Stuart, E. R. Burnett, of Dens and Crichie, Mintlaw
 1876 Tait, John, Crichie, Inverurie
 1876 Taylor, James, Toux, Mintlaw
 1878 Thompson, George, of Pitmedden, 40 Marischal Street, Aberdeen
 1875 Thomson, Wm., Banker, Tarland
 1877 Turnbull, Peter M., Smithston, Gartly
 1858 Turner, John, of Turner Hall, Ellon
 1873 Udney, J. H. F., of Udney and Dudwick, Aberdeen
 1864 Urquhart, B. C., of Meldrum, Old Meldrum
 1876 Urquhart, Major F. P., of Craigston, Turriff
 1888 Walker, Alex., Gunhill, Inverurie
 1884 Walker, David, Coullie, Udney
 1881 Walker, George, Port Elphinstone, Inverurie
 1877 Walker, James, West Side of Brunx, Kildrummy, Aberdeen
 1858 Walker, Wm., Ardhuncart, Mossat
 1876 Watson, George, Edendiack, Gartly
 1864 Watson, J. P., of Blackford, Rothienorman
 1868 Watt, Gordon, Mains of Park, Drumoak
 1889 Watt, John, Newton of Mounie, Daviot, Old Meldrum
 1893 Webster, William, Lowie Barclay, Auchterless, Turriff
 1882 Whyte, John, Advocate, Aberdeen
 1873 Wilken, George, Waterside of Forbes, Alford
 1858 Williamson, A. F., Durno House, Pitcaple, Aberdeen
 1850 Williamson, George, 194 King Street, Aberdeen
 1884 Wilson, A. S., North Kinmundy, Summerhill, Aberdeen
 1805 Wilson, John, Castle Park, Huntly
 1885 Wilson, Wm., Coynachie, Gartly
 1873 Wilson, Thomas, Solicitor, Aberdeen
 1808 Yeats, Alex., Advocate, Aberdeen
 1838 Yeats, William, of Aquharney, Beacons-hill, Aberdeen
 1868 Yull, John S., Little Ardo, Methlick

BANFF.

- 1873 ABERCROMBY, Sir R. J., of Birkenbog, Birk., Forglie, Turriff
 1885 Alcock, John, Balunie, Duftown
 1882 Barclay, Wm., Gordon Arms Hotel, Keith
 1874 Bruce, G., Tochieal, Cullen
 1852 Bryson, W. G., Strathlene, Cullen
 1875 Campbell, James, Cullen House, Cullen
 1887 Cowie, Geo., jun., Pitglassie, Duftown
 1883 Cran, John, Butcher, Keith
 1868 Cumming, George, Writer, Banff
 1889 Cumming, J. F., Cardow, Craigellachie
 1876 Dawson, William, Gordon Castle, Fochabers

Admitted

- 1885 Donaldson, George, Auldtown of Netherdale, Aberchirder
 1880 Duff, Thomas Gordon, Park House, Banff
 1888 Duncan, G. A., Foundry, Banff
 1888 Duncan, R., Anchenbaidie Mains, Banff
 1888 Duncan, Robert, Banff
 1884 Fire, The Duke of, K.T., Duff House, Banff
 1879 Findlater, James Smith, 10 Low Street, Banff
 1884 Gilchrist, James, Baker, Banff
 1881 Gordon, John F., of Cairnfield, Fochabers
 1876 Gordon, P. G., Nevie, Glenlivet, Ballindalloch
 1886 Graham, William, Brewer, Banff
 1876 Grant, G. S., Auchorachan, Glenlivet, Ballindalloch
 1874 Green, Robert, Ruthrie, Aberlour
 1898 Horn, Alex., Brangan, Portsoy
 1870 Inkson, Thomas F., Kinermory, Craigellachie
 1881 Innes, Sir J., of Balveny and Edingight, Barts., Keith
 1876 Kemp, Chas., Methercluny, Duftown
 1888 Kemp, James, Lime Works, Keith
 1889 Kynoch, Geo., Isla Bank Mills, Keith
 1888 Leith, James, Glengerrack Mains, Keith
 1892 Leslie, Alex., Brao House, Keith
 1876 Leslie, A. F., Montcoffer House, Banff
 1885 Longmore, Leith B., Rattie, Banff
 1888 M'Donald, Alexander (M'Donald Bros.), Portsoy
 1885 M'Donald, Alexander, Kinbrough, For-dyce
 1884 MacGillivray, A. E., V.S., Banff
 1891 Macintosh, William, Drummuir, Keith
 1876 Macpherson, J., Mulben, Keith
 1892 Main, J. G., Barnes, Fordyce, Portsoy
 1887 Maitland, Harry Reid, Muirfold, Grange, Keith—*Free Life Member*
 1888 Maitland, William, Muirfold, Grange, Keith
 1880 Menzies, W. G. Stewart, Aikenway, Craigellachie
 1867 Michie, C. Y., Forester, Cullen House
 1874 Miller, John, Seafield, Cullen
 1898 Morison, Alex. O., Corskie, Banff
 1886 Morison, Col. F. D., of Mountblairy, Turriff
 1885 Morison, James O., yr. of Culvie, Aberchirder
 1898 Murray, Alex., Old Manse, Boyndie, Banff
 1888 Murray, William, Mains of Pittendreich, Turriff
 1873 Ogilvie, A. M., Tillynaught, Portsoy
 1873 Paterson, Wm., Auldtown of Carnoustie, Turriff
 1892 Raffin, Robert, Knowiemoor, Fordyce
 1899 Ramsay, Alex., *Banffshire Journal Office*, Banff
 1884 Reid, Wm. T., of Ardmellie, Banffshire
 1840* Richmond and Gordon, The Duke of, K.G., Gordon Castle, Fochabers
 1857 Robertson, William, Port Gordon, Fochabers
 1868 Shand, Geo., Ordens, Boyndie, Banff
 1888 Simpson, Alexander, Duff House, Banff
 1876 Simpson, J. (Auchinachie & Simpson), Keith
 1891 Simpson, Wm., Douglasbrae Manure Works, Keith
 1874 Skinner, Wm. M., Drumin, Ballindalloch
 1888 Smith, Alex., Inchcoursie, Rothiemay
 1862 Smith, J. Gordon, Minmore, Ballindalloch
 1869 Smith, J., Mullochard, Ballindalloch
 1845 Stewart, And., of Auchlunkart, Keith

Admitted

- 1887 Stuart, A. R., of Inverfiddich, Craigellachie
 1878 Stuart, C., Tomindangle, Knockando, Craigellachie
 1876 Turner, R., Auchnarrow, Ballindalloch
 1888 Turner, Robert, Cairnton of Boyndie, Portsoy
 1857 Walker, Francis, Craignethart, Turriff
 1876 Wilson, George, Marypark, Ballindalloch
 1885 Wilson, James, Inchgower, Fochabers

FORFAR

(EASTERN DIVISION).

- 1889 Adam, John, Bolshan, Arbroath
 1884 Allison, Wm., Clearbank, Stracathro, Brechin
 1884 Anderson, D., Woodhill, Carnoustie
 1884 Anderson, James, jun., Mains of Parkhill, Arbroath
 1868 Anderson, Jas., Westside, Brechin
 1890 Arnot, David, Mains of Edzell, Brechin
 1890 Bell, James, Gilchorn, Arbroath
 1890 Bell, Thomas, M.R.C.V.S., Muir drum, Carnoustie
 1849 Campbell, J. A., of Stracathro, M.P., Brechin
 1887 Campbell, Jas. Morton Peto, yr. of Stracathro, Brechin
 1886 Carnegie, Alex., of Redhall, Forebank House, Brechin
 1869 Carnegie, H. L., of Kinblethmont, Arbroath
 1858 Carnegie, W., of Dunlappie, Brechin
 1887 Chalmers, F., Aldbar Castle, Brechin
 1890 Collier, John W., Hatton, Carnoustie
 1879 Colquhoun, Dug., Vitriol Works, Carnoustie
 1859 Coupar, John, Balrownie, Brechin
 1870 Cowe, George, Balhousie, Carnoustie
 1855 Croll, John, Orchard Park, Broughty Ferry
 1891 Cruickshank, A. W., of Langley Park, Montrose
 1874 Cruickshank, Geo., Fryanton, Arbroath
 1858 Dickson, James A., Woodville, Arbroath
 1858 Dickson, J. F., Panbride House, Carnoustie
 1869 Duncan, Jas., Panlathie Mill, Carnoustie
 1862 Erskine, J. E., of Linlathen, Broughty Ferry
 1884 Fairweather, John, Chapletown, Brechin
 1892 Falconer, James, Milton of Conon, Carnyllie, Arbroath
 1885 Finlayson, James, Balcathie, Arbroath
 1890 Fleming, Alex., Charleston, Montrose
 1891 Fleming, James, Friock Mains, Friockheim
 1890 Fletcher, Chas. Fitzroy, of Letham Grange, Arbroath
 1890 Gardyne, James W. Bruce, Middleton House, Friockheim
 1882 Guthrie, C. M. L., yr. of Carnoustie, Dundee
 1880 Hume, David, Barrellwell, Brechin
 1858 Jamieson, D., Auchmithie Mains, Arbroath
 1890 Kydd, James, Scryne, Carnoustie
 1858 Laird, Geo. W., of Denfield, Arbroath
 1890 Lamb, David, Fithie, Farnell, Brechin
 1854 Lyall, David, of Gallery, Montrose
 1890 Lyall, Robert J., Powis, Montrose
 1881 M'Corquodale, David, Banker, Carnoustie
 1889 Miller, James, Balgillo, Broughty Ferry
 1889 Miln, George, Solicitor, Arbroath
 1881 Milne, John, Corn Merchant, Montrose
 1884 Mitchell, Charles, Kintrockat, Brechin

Admitted

- 1879 Mitchell, James, Merchant, Montrose
 1862 Mitchell, Wm., Merchant, Montrose
 1881 Mitchell, Wm., Ledmore, Menmuir, Brechin
 1868 Morgan, D., South Mains of Ethie, Arbroath
 1890 Nicoll, G. F., Chapelton of Leysmill, Arbroath
 1884 Nicoll, Wm., Hilton of Fearn, Brechin
 1893 Nicoll, William, jun., Mains of Gallery, Montrose
 1890 Ogilvie, James Swan, Brackenbrae, Broughty Ferry
 1890 Ouchterlony, Lt.-Col. T. H., The Guynd, Arbroath
 1885 Pattullo, Jas., Abertay, Broughty Ferry
 1891 Pattullo, John, Hatton Mill, Frioekheim
 1884 Petrie, David D., Frioekheim, Arbroath
 1891 RAMSAY, Hon. Charles Manie, Brechin Castle, Brechin
 1882 Robertson, James, Pannure, Carnoustie
 1884 Rodger, Geo., Wauknills, Inverkeillor, Arbroath
 1882 Rodger, Robt., jun., Mains of Dun, Montrose
 1866 Scott, D. G. C., Maisondieu, Brechin
 1889 Scott, William, Pitforthie, Brechin
 1883 Shepherd, John, Lundie, Brechin
 1888 Shield, J. T., Redcastle, Arbroath
 1885 Shiell, John, Solicitor, Brechin
 1889 Smyth, Chas. Armstrong, Duninald, Montrose
 1884 Soutar, D., East Mains of Keithock, Brechin
 1890 Souter, John, Auchrennie, Muirdrum, Carnoustie
 1850† Southesk, The Earl of, K.T., Kinnaid Castle, Brechin
 1880 Stansfeld, Capt. John, Dunninald, Montrose
 1892 Stephen, David K., Commieston, Montrose
 1869 Swan, James, Inverpeffer, Carnoustie
 1871 Swan, W., Balhargie, Monifieth
 1861 Taylor, John, Redcastle, Arbroath
 1890 Taylor, Robt., Pitlilie, Carslongie House, Carnoustie
 1881 Tennant, James, Carlogie Road, Carnoustie
 1873 Thomson, Alex. M., Arbroath
 1876 Vallentine, George, 55 Southesk Street, Brechin
 1874 Wood, Chris., Kintrockat House, Brechin
 1884 Young, George, Panlathie, Carnoustie

KINCARDINE.

- 1876 Adam, William, Bush, Banchory-Ternan
 1857 Anderson, Wm., Hattonburn, Banchory
 1873 АЛЕКСАНДР, Right Hon. Viscount, Arbuthnot House, Fordoun
 1881 Baird, Alex., of Urie, Stonehaven
 1892 Barrie, James, Butcher, Stonehaven
 1884 Braid, Thomas, Durris, Aberdeen
 1873 Brown, W., Pitnamoon, Laurencekirk
 1858 BURNETT, Sir R., of Leys, Bart., Crathes Castle, Banchory
 1858 Calder, R., Rasmoir, Banchory-Ternan

Admitted

- 1871 CLINTON, Right Hon. Lord, Fettercairn House, Fettercairn
 1884 Cooper, John, Ley, Banchory-Ternan
 1892 Cowie, James, Westfield, Stonehaven
 1873 Craighoad, James, Sillyfiat, Bervie
 1858 Crombie, Alex., Thornton Castle, Laurencekirk
 1864 Davidson, J., Harestone, Banchory
 1870 Dickson, Patrick, Laurencekirk
 1860 Duff, Robert W., of Fetterosso, M.P., Stonehaven
 1873 Falconer, Wm., Cairnton, Fordoun
 1873 Fortescue, Archer, of Kingcausie, Aberdeen
 1891 Gammell, Sydney James, yr. of Drumtochy, Fordoun
 1876 GLADSTONE, Sir J. R., of Fasque, Bart., Fettercairn
 1869 Grant, Capt. Frederick G. Forsyth, of Ecclesgreig, Montrose
 1873 Greig, James Booth, Laurencekirk
 1884 Greig, William, Ashentilly, Durris, Aberdeen
 1884 Hart, John, Cowie House, Stonehaven
 1878 Hay, J. T., of Blackhall Castle, Banchory
 1884 Hunter, George, Kirktown of Banchory, Banchory-Ternan
 1888 Innes, Major W. D., of Cowie, Stonehaven
 1873 Kinnear, Arthur W., Stonehaven
 1876 Kinross, J., Coldstream, Laurencekirk
 1876 KINTROSE, Right Hon. The Earl of, Inglemaldie, Laurencekirk
 1876 Littlejohn, William, Easter Tulloch, Stonehaven
 1827 M'Inroy, Lieut.-Col. W., of The Burn, Brechin
 1885 Martin, James, The Grange, Bervie
 1885 Murray, J. J., Factor, Fasque, Fettercairn
 1837 Nicholson, J. Badenach, of Glenbervie, Fordoun
 1868 Pearson, David A., Johnston Lodge, Laurencekirk
 1885 Philip, Forbes, Tullos Home Farm, Nigg, Aberdeen
 1878 Porteous, D. S., of Lauriston, Montrose
 1859 Scott, Hercules, of Brotherton, Johnshaven
 1882 Shand, T. L. R., of Fawsyde, Bervie
 1863 Sinclair, D., of North Loirston, Aberdeen
 1876 Skeen, Geo., Meikle Fiddes, Drumlithie
 1873 Smith, James, Pittengardner, Fordoun
 1873 Smith, John, Balmaln, Fettercairn
 1868 Smith, W., New Mains of Urie, Stonehaven
 1868 Smith, W., of Benholm, Johnshaven
 1880 Strachan, George, Caunterland, Montrose
 1868 Taylor, Geo., of Kirktonhill, Montrose
 1857 Taylor, Robert, Drummenny, Banchory
 1868 Thomson, James, Balbegno, Fettercairn
 1888 Thomson, W. J. Sandford, Balmanno, Marykirk
 1888 TRAFUSIS, Hon. Chas. S. Forbes, Fettercairn House, Fettercairn
 1803† Walker, G. J., Mains, Portlethen, Aberdeen
 1898 Walker, James Wilson, Hillside House, Portlethen, Aberdeen
 1892 Walker, Robt. W., Portlethen, Aberdeen

6.—DUMFRIES DISTRICT.

EMBRACING THE

COUNTIES OF DUMFRIES, KIRKCUDBRIGHT, AND WIGTOWN.

DUMFRIES.

Admitted
 1879 Aitken, John M., Norwood, Lockerbie—
Free Life Member
 1883 Allan, Wm., Drumlanrig Mains, Thornhill
 1884 Armstrong, John S., Grayston, Dumfries
 1887 Anstin, James J. M., of Dalmaekerran, Tynron
 1880 Austin, William, Bank Agent, Thornhill
 1898 Baird, Alex., West Mains, Collin, Dumfries
 1870 Baird, John, Hall, Kirkeonnel, Sanquhar
 1871 Baird, John, Broomhouses, Lockerbie
 1854 Beattie, James, Newbie House, Annan
 1870 Beattie, John, Bulmansknowe, Canonbie
 1873 Beattie, William J. P., Newbie, Annan
 1863 Bell, Alexander, Stobahull, Lockerbie
 1886 Bell, George, Minsea, Lockerbie
 1863 Bell, James, Woodslee, Canonbie
 1878 Bell, William, Todholes, Annan
 1889 Blacklock, John, Solicitor, Dumfries
 1878 Borland, John, Auchencairn, Closeburn, Thornhill
 1859 Borthwick, J. J. M., Billholm, Langholm
 1878 Brostch, George, Thwait, Ruthwell
 1879 Brook, Edward, Hoddam Castle, Ecclefechan
 1878 Brown, David, Eilerslie, Kirkmahoe
 1860 Brown, James, Hardgrave, Ruthwell, R.S.O.
 1886 Brown, James, Burnside, Holywood, Dumfries
 1860 Brown, John C., Between-the-Waters, Ecclefechan
 1884 Brown, Thomas, Guillyhill, Holywood, Dumfries
 1877 Brown, T. M., Closeburn Castle, Thornhill
 1866 Campbell, Lt.-Col. A. H., Kirkland, Thornhill
 1845 Carlyle, T. J., of Templehill, Waterbeck, Ecclefechan
 1893 Carlyle, William Lee, Waterbeck, Ecclefechan
 1880 Carmont, James, British Linen Company Bank, Dumfries
 1854 Carruthers, John, of Miln, Wamphray, Moffat
 1870 Carruthers, John, Tundergarth, Lockerbie
 1876 Carruthers, Joseph, Annan Bank, Moffat
 1882 Carruthers, Joseph, British Linen Co. Bank, Moffat
 1870 Carruthers, R. B., Huntingdon Lodge, Dumfries
 1876 Caven, Thos., Birkshaw, Glencairn, Dunscore
 1876 Charlton, Jn., Corn Merchant, Dumfries
 1878 Chrystal, William, Gilchristland, Thornhill

Admitted
 1878 Connell, J. W. F., of Auchencheyne, Thornhill
 1878 Cormack, John F., Solicitor, Lockerbie
 1886 Craig, Alex., Hunter's Lodge, Thornhill
 1859 Craig, Wm., Laurel Bank, Dumfries
 1872 Cranston, James, Nunwood, Dumfries
 1881 Crawford, Jas., Flossend, Greta
 1892 Crawford, Peter, Eastfield House, Dumfries
 1870 Critchley, J. A., Stapleton Tower, Annan
 1892 Dalgleish, John Smith, Auctioneer, Lockerbie
 1878 Dalziel, Adam, Chanlockfoot, Penpont
 1869 Dalziel, Jas., Victoria Terrace, Dumfries
 1878 Dalziel, Robert, Druidhall, Penpont
 1884 Dickson, George, Braehad, Collin, Dumfries
 1862 Dickson, John H., Dabton, Thornhill
 1840 Dickson, T., Drumcruilton, Thornhill
 1886 Dobie, Alexander, Hitchell, Annan
 1878 Dobie, David, Banker, Lockerbie
 1868 Douglas, A. H. Johnstone, of Lockerbie, Connelgan Castle, Ruthwell, R.S.O.
 1884 Edmondson, James H., of Riddingwood, Ainsfield, Dumfries
 1874 Erskine, Henry, Buccleuch Square, Langholm—*Free Life Member*
 1860 Farish, Samuel, Kirkland, Lockerbie
 1877 Farish, Samuel T., Kirkland, Lockerbie
 1877 Farish, William R., Tinwald Parks, Dumfries
 1878 Fleming, Gavin, Crowdie Knowe, Ecclefechan
 1882 Gillespie, Denholm, 6 Marchbank Terrace, Dumfries
 1873† Gillespie, Rev. John, Mouswald Manse, Ruthwell, R.S.O.
 1860 Gordon, Henry, Moatbrae, Dumfries
 1884 Graham, Major-General John Gordon, of Wyseby, Ecclefechan
 1852 Graham, John, of Shaw, Lockerbie
 1859 Gray, Alex., Tanlawhill, Langholm
 1880 Grierson, Sir A. D., of Legg, Bart., Dumfries
 1872 Grieve, Archd., Albierigg, Canonbie
 1891 Halliday, James, Silencairn, Annan
 1880 Harkness, W. L., Mitchellslacks, Thornhill
 1892 Hayes, John, Dormont Grange, Lockerbie
 1880 Henderson, James, Kelloside, Sanquhar
 1887 Henderson, John, Solicitor, Dumfries
 1862 Hewatson, J., Auchencainzie, Thornhill
 1870 Hiddleston, John, Kirkland, Closeburn, Thornhill
 1884 Howat, John, Lower Netherwood, Dumfries
 1884 Hunter, James, Lochside, Lockerbie
 1886 Hutchison, John, Cresswell House, Dumfries

Admitted

- 1880 Hyslop, Wm., Glenries, Sanquhar
 1870 Irvine, B., Assembly Street, Dumfries
 1888 Irving, D. J. Bell, yr. of Whitehill, Lockerbie
 1869 Irving, J. Bell, of Whitehill, Lockerbie
 1885 Irving, H. C., of Burnfoot, Ecclefechan
 1873 Irving, Samuel, Carco, Kirkconnel
 1846 Jardine, James, of Dryfeholm, Lockerbie
 1888 Jardine, Jas. C., Broomhills, Annan
 1863 JARDINE, Sir Robert, of Castlemilk, Bart., Lockerbie
 1893 Jardine, Robert William Buchanan, yr. of Castlemilk, Lockerbie
 1890 Jeffrey, John J., Blackaddie, Sanquhar
 —Free Life Member
 1877 Johnston, James, Thistle Cottage, Dumfries
 1859 Johnston, Thomas, Moffat
 1878 Johnston, Wm., of Cowhill, Dumfries
 1886 Johnstone, Andrew J. S., of Halleaths, Broadholm, Lockerbie
 1878 Johnstone, James, Hunterheek, Moffat
 1859 Johnstone, John A., Archbank, Moffat
 1870 Johnstone, J. J. Hope, of Annandale, Raehills, Lockerbie
 1881 Johnstone, Michael, Archbank, Moffat
 1859 Johnstone, Robert, Polmoodie, Moffat
 1859 Johnstone, Walter, Alton, Moffat
 1863 Kennedy, David, Castlehill, Dumfries
 1864 Kerr, Abram, Castlehill, Durrisdear
 1878 Kerr, Archd., Upper Dormont, Lockerbie
 1875 Kerr, Jn., Blountfield, Ruthwell, R.S.O.
 1892 Kirkpatrick, Andrew, Auchengibbert, Crocketford
 1875 Kirkpatrick, David, Amisfield, Townfoot, Dumfries
 1879 Kirkpatrick, Jas., Rigghead, Torthorwald
 1870 Kirkpatrick, James, Auctioneer, Annan
 1884 Lawrie, John P., Shieldhill, Lochmaben
 1878 Lennox, David, Merchant, Dumfries
 1865 Leny, W. Macalpine, of Dalswinton, Dumfries
 1873 Lindsay, James, Whitecastles, Lockerbie
 1869 Little, James, Sark Tower, Canonbie
 1878 Little, James Church, Burnfoot, Langholm
 1884 Little, John Malcolm, Carlesgill, Langholm
 1888 Little, Murray, Solicitor, Annan
 1885 Lockhart, Peter, Springkell Estate Office, Ecclefechan
 1870 Lusk, Andrew, Lochvale, Dumfries
 1870 Lyon, Thomas A., Whitecroft, Ruthwell, R.S.O.
 1887 M'Call, Alexander, Rook Hall Mains, Collin, Dumfries
 1870 M'Call, George, Cassalsands House, Maxwelltown, Dumfries
 1870 M'Call, James, of Caithloch, Moniaive
 1878 M'Clure, Wm., Banker, Lockerbie
 1868 M'Connell, Fred., of Blackyett, Ecclefechan
 1882 MacCowan, A., of Newtonsairs, Holywood
 1888 M'Creath, John, Comlongan Mains, Ruthwell, R.S.O.
 1887 Macdonald, Alexander, Grain Merchant, Lockerbie
 1878 Macfarlan, George, Closeburn Mains, Thornhill
 1885 M'Gibbon, James R., Union Bank, Moffat
 1860 M'Gill, James, Banker, Dumfries
 1886 M'Intosh, A. J., V.S., Dumfries
 1887 M'Jannet, F. J., Gateslack, Thornhill
 1888 M'Jarrow, David, Solicitor, Lockerbie
 1878 Mackay, D., Hurdledale, Cummertrees, Annan

Admitted

- 1886 Mackenzie, John A., Solicitor, Lockerbie
 1879 M'Kenzie, Neil, Holestane, Thornhill
 1860 Mackie, John, Sarkshields, Ecclefechan
 1870 M'Millan, John, of Glencrosh, Moniaive
 1886 M'Nae, Robert, V.S., Dumfries
 1878 M'Tier, John, of Ladyfield, Dumfries
 1840 Malcolm, W. E., of Burnfoot, Langholm
 1880 Martin, William, Dardarroch, Dumfries
 —Free Life Member
 1888 Maxwell, Chas. H., The Grove, Dumfries
 1870 Maxwell, Sir John R. Heron, of Springkell, Bart., Ecclefechan
 1878 Maxwell, George, of Broomholm, Langholm
 1882 Maxwell, Joseph, Seedsman, Thornhill
 1867 Maxwell, Maxwell Hyslop, of The Grove, Dumfries
 1886 Miller, Wm., Lakehead, Closeburn, Thornhill
 1878 Milligan, James, Hayfield, Thornhill
 1870 Milligan, John, Auldgrith, Dumfries
 1886 Milne, Thomas, Grain Merchant, Lockerbie
 1870 Minto, John D., Dumfries
 1870 Mitchell, Joseph M., Burnscairth Green, Dumfries
 1860 Moffat, James, Gateside, Sanquhar
 1862 Moffat, Thomas, Sunnyhill, Dumfries
 1888 Moffat, Wm., Garwald, Langholm
 1878 Monilaws, Rev. James J., Middlebie Manse, Ecclefechan
 1878 Murray, Allan, Castlemilk Mill, Lockerbie
 1891 Murray, Archibald, Corsehill Quarries, Annan
 1886 Newbigging, Thos. Kennedy, Nurseryman, Dumfries
 1870 Paterson, David J., Watch Hall, Annan
 1889 Paterson, Francis, Clerkhill, Langholm
 1885 Paterson, John S., Craigdarroch, Sanquhar
 1881 Paterson, J. Jardine, of Balgray, Lockerbie
 1854 Paterson, J. W. J., Terrona, Langholm
 1884 Paterson, Robert, of Robgill Tower, Ecclefechan
 1878 Paterson, Robert B., V.S., Irving Street, Dumfries
 1885 Paterson, Wm., E. Craigdarroch, Sanquhar
 1886 Paterson, Wm., Rock Hall, Dumfries
 1892 Pilkington, L. Cavens, Dumfries
 1884 Primrose, John, Solicitor, Dumfries
 1869 QUEENSBERRY, The Marquis of, Kinmount, Annan
 1888 Rae, James, of Kirkpatrick-Fleming and Newton, Ecclefechan
 1884 Rain, Rev. Thos., Hutton Manse, Lockerbie
 1874 Ranken, John S., Lawesknowe, Moffat
 1891 Rankin, William, Waukmill, Thornhill
 1880 Rannie, D. W., of Conheath, Dumfries
 1884 Richardson, John, Braehead, Heck, Lockerbie
 1878 Richardson, William, Milnfield, Annan
 1884 Richardson, Wm., Cotland, Dumfries
 1884 Roddick, Frank, Trailtrow, Ecclefechan
 1893 Scott, Chas. C., Breconside, Moffat
 1878 Scott, Robert A., Kirkbank, Dumfries
 1893 Scott, William Black, Ashley Bank, Langholm
 1877 Semple, Wm., Mouswald Banks, Ruthwell, R.S.O.
 1878 Sloan, James, Coachbuilder, Dumfries
 1883 Sloan, Hugh, Gillenbie, Lockerbie
 1878 Smith, Edward, Oakfield Terrace, Noblehill, Dumfries
 1877 Smith, Robert, Dalbible, Dumfries

Admitted

- 1870 Smith, Thomas, Twiglees, Lockerbie
 1873 Smith, Thomas K., Park View, Closeburn, Dumfries
 1859 Steuart, Patrick, Middlegill, Moffat
 1870 Stewart, Donald, Morton Mains, Thornhill
 1860 Stewart, Peter, Dornock Mains, Annan
 1807 Stobo, Andrew, Porters town, Auld girth
 1880 Stobo, James, Halliday Hill, Auld girth
 1878 Struthers, William, Logan Mains, Canonbie
 1880 Symons, John, Solicitor, Dumfries
 1870 Taylor, Joseph, Potholm, Langholm
 1878 Thompson, Alexander, Ironmonger, Dumfries
 1869 Thomson, J. S., of Brae, Dumfries
 1878 Thomson, Robert, of Brae, Dumfries
 1878 Thomson, William, M'Cheynston, Auld girth
 1878 Todd, Alex., Mouswald Grange, Ruthwell, R.S.O.
 1890 Underwood, Wm., Ironmonger, Annan
 1878† Villiers, F. E., Closeburn Hall, Thornhill
 1858 Walker, Lieut.-Col. Geo. C., of Crawfordton, Thornhill
 1886 Wallace, James R. W., Auchenbrack, Thornhill
 1889 Wallace, John William, Wallace Hall, Auld girth
 1885 Wallace, William, of Whitewoolen, Lockerbie
 1856 Warwick, W., Arkinholm Terrace, Langholm
 1875 Waugh, John, Granton, Moffat
 1880 Whitelaw, James W., Solicitor, Dumfries
 1884 Whittle, John, Kinnelhead, Moffat
 1860 Wightman, John Seton, of Courance, Lockerbie
 1880 Wilson, George, Dalveen, Thornhill
 1870 Wilson, James R., Banker, Sanquhar
 1878 Wilson, P. M'C., Nether Gribton, Dumfries
 1877 Wright, Thomas, Bengall, Lockerbie
 1864 Yorstoun, M. C., of Tinwald, Irvine House, Canonbie
 1801 Young, John, Moffat

KIRKCUDBRIGHT.

- 1889 Adamson, John, of Craignadam, Dalbeattie
 1870 Anderson, Robert, Alleyford, Kirkgunzeon
 1889 Barbour, Wm., Troquhain, New Galloway
 1884 Barrowman, John H., Caigton, Castle Douglas
 1871 Bell, William, of Gribdale, Kirkcudbright
 1878 Berwick, John, Whiteside, Kirkgunzeon
 1878 Biggar, James, Grange Farm, Dalbeattie
 1858 Biggar, Thos., of Chapelton, Dalbeattie
 1886 Biggar, Wm., Chapelton, Dalbeattie
 1886 Blacketh, Lieut.-Col. C. E., of Arbigland, Dumfries
 1878 Brown, John, Airds of Kirkconnell, New Abbey
 1878 Brown, John Gordon, Lochanhead, Dumfries
 1870 Brown, Joseph, Hermitage, Dalbeattie
 1861 Brown, Oliphant, Dalry, Galloway
 1864 Brydon, Jas., Knocknaring, New Galloway
 1892 Caird, James A., of Cassenary, Cree town
 1892 Campbell, John, care of Johnstone, Hamilton Place, Castle Douglas—Free Life Member
 1885 Campbell, Robert J., Cull, Castle Douglas—Free Life Member

Admitted

- 1858 Campbell, Thomas, V.S., Kirkcudbright
 1879 Cannon, James, Urieoch, Castle Douglas—Free Life Member
 1877 Cannon, John, Rosebank, Dalbeattie
 1874 Chalmers, Archd., of Kipp, Dalbeattie
 1890 Cliff, Edward A., Mable, Dumfries
 1800 Corrie, Adam, South Park, Kirkcudbright
 1860 Craig, Joseph, of Threecrofts, Lochrutton, Dumfries
 1878 Craik, Geo., Argrennan Mains, Tongland
 1866 Cuninghame, R. D. B., of Hensol, Castle Douglas
 1864 Cunningham, Jas., Tarbreoch, Dalbeattie
 1889 Cunningham, John, Tarbreoch, Dalbeattie
 1879 Currie, John, Kirkeoch, Kirkcudbright
 1878 Douglas, Wm. D. R., of Orchardton, Castle Douglas
 1851 Dudgeon, Patrick, of Cargen, Dumfries
 1877 Dudgeon, R. F., The Grange, Kirkcudbright
 1889 Duncan, James, East Glenarm, Crockettford, Dumfries
 1884 Dunlop, Captain H. L. Murray, of Corsack, Dalbeattie
 1886 Farish, James, Lincluden Mains, Dumfries
 1889 Fergusson, Robert W., of Kilquhanity, Dalbeattie
 1859 Frazer, John, Maxwellfield, New Abbey, Dumfries
 1860 Gibson, J. T., Tullowquhain, Kirkbean
 1884 Gibson, Robert, Hightae, Castle Douglas
 1888 Gillespie, William, Solicitor, Castle Douglas
 1886 Gilmour, W. P., Balmangan, Kirkcudbright
 1886 Gordon, Alexander J., Kirkcudbright
 1885 Gordon, Edward, Keltonhill, Castle Douglas
 1877 Gordon, James, Castle Douglas
 1879 Gordon, Sir William, of Earliston, Bart., Kirkcudbright
 1878 Gray, Adam, jun., Ingles ton of Borgue, Kirkcudbright
 1859 Grierson, Joseph, Breoch, Castle Douglas
 1859 Grierson, Wm., 41 Queen Street, Castle Douglas
 1878† Herries, Right Hon. Lord, Kinharvey, New Abbey
 1853 Herries, A. Y., of Spottes (16 Heriot Row, Edinburgh), Dalbeattie
 1857 Hewat, Richard, Writer, Castle Douglas
 1876 Honeyman, John, Queenshill, Ringford
 1878 Hood, David A., Balgreddan, Kirkcudbright
 1884 Hood, Wm., Chapelton, Borgue
 1877 Hope, Hon. Charles, St Mary's Isle, Kirkcudbright
 1886 Hope, John, Commander R.N., St Mary's Isle, Kirkcudbright
 1878 Houston, John, The Hill, Castle Douglas
 1886 Hughtan, Major Henry H., of Airds, Castle Douglas
 1880 Hutchison, Graham, of Balmaghie, Castle Douglas
 1879 Hutchison, J. W., of Edinghame, Castle Douglas
 1870 Hyslop, And., Auchenroch, Dalbeattie
 1886 Jamieson, John, Jameston House, Carsphairn
 1871 Kay, D. J., of Drumpark, Dumfries
 1846 Kennedy, J. L., of Knocknalling, Dalry, Galloway
 1878 Kennedy, J. M., yr. of Knocknalling, Dalry, Galloway
 1890 Kerr, Jas., Mid-Kelton, Castle Douglas—Free Life Member

Admitted

- 1870 Kerr, Jos., Flatts of Cargen, Dumfries
 1860 Kerr, Thomas, Kirkcrist, Kirkcudbright
 1891 Kirwan, Major Wm. F. Maitland, of Gellston, Castle-Douglas
 1878 Kirwan, L. M., Collin, Auchencairn
 1848 Laurie, W. K., of Woodhall, Castle-Douglas
 1804 Lidderdale, W. H., Writer, Castle-Douglas
 1878 Little, Wm., High Bogue, Twynholm
 1889 Livingston, Alexander, Lochside, Lochrutton, Dumfries
 1878 McConchie, John, Carsewiloch, Creetown
 1878 McOormick, John, Lochenkitt, Corsock, Dalbeattie
 1876 MacKerrow, M. S., Boreland of Southwick, Dumfries
 1875 McKie, Andrew, Blakett, Crockettford
 1878 McKie, John, of Bargaly, Castle-Douglas
 1882 Mackie, John Gladstone, of Auchencairn, Castle-Douglas
 1878 McKinnel, Wm., Butterhole, Dalbeattie
 1876 McLarin, Dugald, Dalbeattie
 1879 M'Nab, R. W., Banker, Dalbeattie
 1870 M'Queen, James, of Crofts, Dalbeattie
 1876 M'Taggart, John, Culnaightry, Castle-Douglas
 1878 M'Turk, W. A., Barlae, Dalry, Galloway
 1888 M'William, John, Carantyne Villa, Dalbeattie
 1885 Marshall, Wm., Loch Fergus, Kirkcudbright
 1878 Maxwell, George, of Glenlee, New Galloway
 1878 Maxwell, James, Screel, Castle-Douglas
 1878 Maxwell, W. J., Terregles Banks, Dumfries
 1879 Maxwell, Wellwood, of Kirkennan, Dalbeattie
 1886 Maxwell, Wellwood, of The Forest, New Galloway
 1839+ Maxwell, Wellwood H., of Munches, Dalbeattie
 1886 Maxwell, Sir W. F., of Cardoness, Bart., Gatehouse
 1873 Maxwell, W. J., yr. of Munches, M.P., Terraughtie, Dumfries
 1878 Mitchell, Andrew, Barcheskie, Kirkcudbright
 1867 Moffat, James, of Kenervie, Banker, Castle-Douglas
 1878 Montgomery, And., of Netherhall, Castle-Douglas
 1879 Montgomery, John, Comstonend, Twynholm
 1878 Montgomery, William, Banks, Kirkcudbright
 1886 Morris, Christopher, of Barons Craig, Dalbeattie
 1878 Muir, James, Lochfergus, Kirkcudbright
 1877 Muir, Wm., Lochdougan, Castle-Douglas
 1879 Murray, B. R., of Parton, Castle-Douglas
 1879 Murray, G. R., yr. of Parton, Castle-Douglas
 1890 Nicholson, William, Bombie, Kirkcudbright
 1873 Nivison, Stewart, Lairdlaugh, Dalbeattie
 1878 Ovens, Walter, Torr House, Castle-Douglas
 1889 Picken, David L., Milton, Kirkcudbright
 1883 Rae, William, Halldykes, Rotchell Park, Dumfries
 1870 Rain, Wm., Kempleton, Twynholm
 1861 Riggs, Wm., Banks, Kirkcudbright
 1888 Shennan, John K., Balig, Kirkcudbright
 1888 Shennan, R., Balig, Kirkcudbright
 1857 Skirving, Adam, of Croys, Dalbeattie
 1882 Smith, Jas., Standingstone, Twynholm, Castle-Douglas

Admitted

- 1877 Spalding, A. F. M., of Hlolin, New Galloway
 1870 Sproat, R., Lennox Plunton, Kirkcudbright
 1878 Sproat, W. T., Bogue House, Kirkcudbright
 1857 Stewart, H. G. Murray, of Broughton, Gatehouse
 1886 Stewart, Robert, of Culgruff, Cross-michael
 1878 Stewart, Captain William, of Shambellie, Dumfries
 1868 Synnington, G. C., Kirkcarswell, Kirkcudbright
 1889 Taylor, James, Meikle Ernambrie, Castle-Douglas
 1884 Templeton, Matthew, Dromore, Kirkcudbright
 1869 Thomson, John, Laggan, Gatehouse
 1886 Timms, H. A., of Slogaie, New Galloway
 1878 Veitch, Andrew, Girthon Kirk, Gatehouse
 1879 Wallace, J., Foundry, Castle-Douglas
 1886 Wallace, M. G., Torrogletown, Dumfries
 1870 Wallace, R., Foundry, Castle-Douglas
 1870 Wallace, R., Langbarns, Kirkcudbright
 1886 Waller, John, Auction Mart, Castle-Douglas
 1879 Williamson, A., Meikle Spyland, Kirkcudbright
 1890 Williamson, Captain Cecil H., Carlingwork, Castle-Douglas
 1871 Williamson, Thos., Merchant, Kirkcudbright
 1878 Wylie, Wm., Pleasance of Cargen, Dumfries

WIGTOWN.

- 1843 Agnew, R. V., of Barnbarroch, Whauphill, N.B.
 1875 Agnew, William, Balwherrie, Stranraer
 1878 Anderson, Charles, Barsalloch, Port William
 1864 Anderson, Peter, Callenders House, Whithorn
 1878 Barbour, Robert, Balgowan, Ardwell, Stranraer
 1878 Black, Thomas, Craigencrosh, Stranraer
 1878 Broadfoot, Peter, West Mains, Kirkinner
 1890 Campbell, Robert, jun., Craichmore, Stranraer
 1877 Cochran, Robert, Caldons, Stoneykirk
 1885 Cochran, William, Auchentibbert, Sandhead, Stranraer
 1869 Cowan, George, Mains of Park, Glenluce
 1870 Drow, James, of Craigenallie, Newton-Stewart
 1891 Drynan, Thomas Wallace, Carscreugh, Glenluce
 1889 ELLIOT, The Hon. Hugh F. H., of Corwar, Newton-Stewart
 1878 Forsyth, John, Reiffer Park, Sorbie
 1857 Frederick, D., of Gass, Stranraer
 1869 Frederick, Robt., Drundlower, Dunragit
 1877 Frederick, Thomas, Cairnhandy, Stoneykirk
 1800+ GALLOWAY, Right Hon. The Earl of, Galloway House, Garlieston
 1871 Gourlay, R. C., Arbrack, Whithorn
 1880 Greig, T. C., Rephad, Stranraer
 1878 Hardie, J., jun., Mull of Galloway, Stranraer
 1848 HAY, Sir J. C. D., of Park Place, Bart., Glenluce
 1870 Hewatson, Jos., Balterson, Newton-Stewart

Admitted

- 1877 Hughan, Peter H., Cults, Whithorn
 1886 Hunter, James, Culgroat, Stranraer
 1888 Hunter, Wm., Garthland Mains, Stranraer
 1871 Jamieson, Thomas, High Curchie, Drumore, Stranraer
 1867 Lang, Alex., Boreland, Glenluce
 1878 Lockhart, James, Mains of Airies, Stranraer
 1878 Logan, David, Fernbank, Stranraer
 1843 Lorimer, T. W., Newton-Stewart
 1877 Lusk, Peter, Craigcaille, Stranraer
 1888 M'Caig, John, Challoch, Leswalt, Stranraer
 1887 M'Caig, John, High Mye, Stoneykirk
 1876 M'Cameron, John, Kirronrae, Stranraer
 1892 M'Clean, James, Auchincal, Stranraer
 1892 M'Clelland, And., Glenturk, Wigtown
 1878 M'Clew, David A., Chapel Rossan, Stranraer
 1878 M'Conchie, A., Mains of Penninghame, Newton-Stewart
 1857 M'Connell, J. A., Chapelheron, Whithorn
 1878 M'Connell, Thomas M., V.S., Wigtown
 1882 M'Connell, Wm., Glassnick, Kirkcowan
 1877 M'Cosh, Peter, Cairngawn, Kirkmaiden
 1884 M'Cracken, Robt., Creamery, Dunragit
 1870 M'Culloch, John, Glenhead, Stranraer
 1878 M'Culloch, Peter, Whitefield, Glenluce
 1865 M'Douall, James, of Logan, Stranraer
 1870 M'Dowall, Andrew, Auchtralure, Stranraer
 1878 M'Dowall, R., Auchengallie, Port William
 1860 M'Gill, John, Barsalloch, Wigtown
 1870 M'Haffie, Wm. J., of Torhousemuir, Wigtown
 1871 M'Ilraith, Thos., Barwhanny, Kirkinner
 1878 M'Ilwrick, Alex., Quarter, New Luce
 1860 M'Lean, James, Clerk of Supply, Wigtown
 1857 Maclelland, Thos., North Balfarn, Kirkinner
 1874 M'Master, Allan, Dinvin, Portpatrick
 1871 M'Master, Hugh, Blairbry, Port William
 1878 M'Master, James, Currochtree, Stranraer
 1876 M'Master, John, Culhorn Mains, Stranraer

Admitted

- 1876 M'Master, William, Challoch, Dunragit
 1889 M'Master, Wm., junior, Cruggleton, Garlieston
 1878 M'Whinnie, Alex., Airyolland, Port William
 1885 Marshall, Matthew, Stranraer
 1878 Matthews, A. B., British Linen Bank, Newton-Stewart
 1858 Matthews, Niven, Newton-Stewart
 1877 MAXWELL, Sir H. B., of Monreith, Bart., M.P., Whauphill, N.B.
 1887 Menzies, W. M., Cults, Castle Kennedy
 1875 Milroy, James, Galdenoch, Stoneykirk
 1876 Milroy, John, Balgrogan Mains, Stranraer
 1891 Murray, Alex., Kilfillan, Glenluce
 1860 Picken, R., Barnkirk, Newton-Stewart
 1885 Ralston, Robert, Greyhill, Stoneykirk
 1888 Ralston, Wm. H., Culmore, Stranraer
 1878 Rankin, Alex., Aird, Stranraer
 1878 Routledge, C. M., Banker, Port William
 1878 Routledge, J. J. F., Old Mill, Port William
 1870 Routledge, Wm., Elrig, Port William
 1878 Smith, William, Garvarie, Port William
 1845† STAIR, The Earl of, K.T., Lochinch, Castle Kennedy Station
 1891 Stevenson, Robert, Balcarry, Glenluce
 1892 STEWART, Major-General The Hon. Alex., of Corsbie, Newton-Stewart
 1809 STEWART, Sir M. J., of Southwick, Bart., M.P., Ardwell
 1846 Stewart, R. H. J., of Physgill and Glaserton, Whithorn
 1868 Symington, Gilbert, Glenluce
 1871 Thompson, Alex., Barneal, Port William
 1858 Todd, James, Gillespie, Glenluce
 1869 Todd, William, Auchness, Ardwell
 1882 Walker, William, Home Farm, Garlieston
 1890 Wallace, James A., Claycrop, Kirkinner
 1887 Watson, Allan Thomson, Genoch, Dunragit
 1870 Whyte, James A., Kirkmabreck, Stranraer
 1878 Wilson, John, West Freugh, Stranraer
 1878 Wither, James, Lagganmore, Portpatrick
 1885 Wright, Hugh, of Alticry, Port William
 1860 Young, J. A., Orchardtown, Garlieston

7.—INVERNESS DISTRICT.

EMBRACING THE

COUNTIES OF CAITHNESS, ELGIN, INVERNESS, NAIRN, ORKNEY
AND SHETLAND, ROSS AND CROMARTY, AND SUTHERLAND.

CAITHNESS.

- Admitted**
 1874 Adam, Thomas, of Lynegar, Wick
 1865 Brims, James, Thurso
 1874 Brock, John, Princes Street, Thurso
 1892 Brown, George, Watten Mains, Watten
 1847 Henderson, Alexander, of Stemster, Thurso (89 Palmerston Pl., Edinburgh)
 1883 Henderson, David F., yr. of Stemster, Halkirk, N.B.
 1874 Henderson, A. W., of Bilbster, Wick
 1883 Henderson, Capt. J. H., Rosebank, Wick
 1881 Horne, Edward Wm., of Strkoke
 1892 Innes, Donald, Sandside, Thurso
 1873 Irvine, G. F., Shrubbery Bank, Thurso
 1874 Leung, William, Skail, Thurso
 1871 M'Beath, James, Brims, Thurso
 1861 Miller, John, of Scrabster, Thurso
 1881*†PORTLAND, His Grace The Duke of, Langwell, Wick
 1861 Purves, James, Barrogill Mains, Wick
 1889 Purves, William, Thurdistoft, Thurso
 1884 Robertson, Robert, Implement Maker, Wick
 1881 Sandison, M., Hempriggs, Wick—*Free Life Member*
 1892 Sinclair, Alex., Quoys of Reiss, Wick
 1857 SINCLAIR, Sir J. G. T., of Ulbster, Bart., Thurso Castle, Thurso
 1886 SINCLAIR, Sir John R. G., of Dunbeath, Bart., Barrock House, Wick
 1864 SINCLAIR, Sir Robert C., of Stevenson, Bart., Achvarsdale Lodge, Reay, Thurso
 1872 Sinclair, W. S. Thomson, of Freswick, Dunbeath Castle
 1855 Smith, James, of Olrig, Thurso
 1876 Sutherland, Alex., Rampyards, Watten—*Free Life Member*
 1862 Tait, Wm. Reid, Mina Villa, Thurso
 1871 Waters, George S., Tistermains, Halkirk Road

ELGIN.

- 1889 Adam, John, Coulardbank, Lossiemouth
 1898 Anderson, George H., Ironmonger, Elgin
 1884 Anderson, Robert, Viewfield, Elgin
 1871 Black, James, of Sherrifston, Elgin
 1871 Brown, William, Earlsmill, Forbes—*Free Life Member*, 1878
 1854 Brown, Wm., of Dunkinty, Elgin
 1878 Bruce, D. C., Byres, Fochabers
 1864 Bruce, George, Woodside, Elgin
 1884 Brydon, John, Forester, Rothes
 1865 Cameron, Alexander, of Mainhouse, Highfield, Elgin
 1893 Clark, Donald, Blervie Castle, Forbes
 1871 Colvin, James E., Wester Manbean, Elgin

- Admitted**
 1850 Creyk, Dr A., Dalvey, Advie, Strathspay
 1878 Cruickshank, David, Meft, Elgin
 1862 Cruickshank, John, Knock, Elgin
 1875 Cruickshank, John, Pond Park, Craigellachie
 1874 CUMMING, Sir Wm. G. Gordon, of Altyre, Bart., Forbes
 1889 DUNBAR, Sir Arch., of Northfield, Bart.
 1888 Edgar, James, Nether Bogside, Elgin
 1855 Ferguson, John, Lossiemouth
 1850 Garden, Arch., of Bernery, Forbes
 1890 Gilchrist, Wm., Leuchars, Elgin
 1860 Gordon, George, Land Surveyor, Elgin
 1864†Grant, C. Macpherson, of Drumduan, Forbes
 1859*†GRANT, Sir George Macpherson, of Ballindalloch, Bart.
 1883 Grant, John Macpherson, yr. of Ballindalloch
 1879 Grant, J., Mains of Advie, Advie
 1871 Grant, John, Inverladnan, Carr Bridge
 1880 Haddon, F. M., St Mary's, Orton, Fochabers
 1888 Henderson, Peter, Factor, Ballindalloch
 1864 Hunter, John, Dipple, Fochabers
 1888 Hutcheson, James, W.S., Elgin
 1874 Lawrence, James, Forbes Mills, Forbes
 1858 Leitch, A. K., Inchstally, Forbes
 1865 M'Bean, D., Auchterblair, Carr Bridge
 1886 M'Gregor, Captain James, Balmuenach, Cromdale
 1883 Macdonald, Wm., Carsewell, Alves
 1870 Mackay, H. M. S., Banker, Elgin
 1870 Mackay, R. J., Burgie Lodge, Forbes
 1882 Mackenzie, F. C., Forbes
 1886 Mackenzie, Thomas, Carron, Strathspay
 1882 Mackessack, George R., yr. of Ardyge and Roseisle, Forbes
 1865 Mackessack, James, Earnside, Forbes
 1857 Mackessack, John, Balnaferry, Forbes
 1874 Mackessack, John, Kinlos, Forbes
 1864 Mackessack, Robert, of Ardyge and Roseisle, Forbes
 1882 Mackessack, R. H., Newton of Struthers, Forbes
 1891 MacLeod, Captain Norman, of Dalvey, Forbes
 1876 M'William, James, Stoneytown, Keith
 1875 Peterkin, James Grant, of Grange, Forbes
 1871 Petrie, George, Rosehaugh, Elgin
 1883 Petrie, George, Pitariha, Elgin
 1876 Petrie, W. A., Rosebrae, Elgin
 1878 Reid, Alexander, Architect, Elgin
 1874 Robertson, William, Linkwood, Elgin
 1870 Robertson, Wm. A., Mayfield, Forbes
 1882 Russell, Alex., Myreside, Elgin
 1874 Scott, Robert, Easter Manbean, Elgin
 1898 Stuart, John Paul, Orbliston, Fochabers

Admitted

- 1877 Sutor, James, The Collie, Fochabers
 1888 Thunlow, Right Hon. Lord, Dunphail, Forres
 1875 Tulloch, John, Grangegreen, Forres
 1882 Urquhart, Robert, jun., Forres
 1850 Walker, Robert, Aityre, Forres
 1888 Watson, H. A., U.P. Manse, Forres—
Free Life Member
 1875 Watt, James, Surradale, Westfield, Elgin
 1881 Wedderspoon, James, Fochabers
 1870 Wight, Alexander, Ironmonger, Forres
 1864 Yool, Thomas, Calcots, Elgin
 1852 Young, Alex., Findraassie House, Elgin
 1871 Young, James, Waterton, Elgin

INVERNESS.

- 1865 Alison, James M., Beaully
 1874 Allan, William, Clury, Durnain Bridge
 1865 Anderson, James, Solicitor, Inverness
 1889 Anderson, William, Solicitor, Inverness
 1886 Baillie, A. C., Dochgarroch, Inverness
 1883 Baillie, James E. B., of Dochfour, Inverness
 1880 Baird, John, of Knoydart, Inverie House, Ornsay, Skye
 1891 Barron, James, Editor of the *Inverness Courier*, Inverness
 1882 Baxter, Frederick, Seedsman, Inverness
 1883 Bethune, Angus, Seafeld, Inverness
 1883 Birnie, Alex., Wellhouse, Beaully
 1892 Birnie, John, Balmafetack, Inverness
 1874 Biscoe, T. Ramsay, of Newton, Inverness
 1883 Black, Robert, C.E., Inverness
 1874 Blair, Patrick, Sheriff-Substitute, Inverness
 1877 BLANTYRE, Hon. The Master of, Ellanreach, Glenslg
 1892 Boyd, Donald, Merchant, Fort-William
 1891 Cameron, Angus, Ben Nevis Auction Mart, Fort-William
 1859†Cameron, Donald, of Lochiel, Auchnacarry, Fort-William
 1890 Cameron, James, Coulnakyle, Nethy Bridge, R.S.O.
 1892 Cameron, James T., Tallisker, Carbosk, Skye
 1891 Cameron, John, Culreach Mains, Nethy Bridge, R.S.O.
 1892 Cameron, Robt. D., Lochgorin, Inverness
 1884 Campbell, A. D., of Kilmartin, Glen Urquhart
 1891 Campbell, G. J., Solicitor, Inverness
 1891 Cattell, James, Balnaglack, Petty, Inverness
 1865 Chisholm, Duncan, 42 Waterloo Place, Inverness
 1874 Chisholm, John, 8 Academy Street, Inverness
 1871 Cran, John, Kirkton, Bunchrew, Inverness
 1865 Davidson, Robert, 20 Academy Street, Inverness
 1888 Davidson, Samuel, Guisachan, Beaully
 1892 Davidson, Thos. M., Dalcullich, Daviot, Inverness
 1888 Dick, W. G., Horse-hirer, Inverness
 1865 Dougall, Andrew, Railway Manager, Inverness
 1887 Duncan, James, Fern Villa, Inverness
 1862†DUNMOAR, Right Hon. The Earl of, Isle of Harris
 1874 Elliot, Matthew, Fleisher, Inverness
 1890 Ferguson, Fergus, Monkstad, Uig, Portree
 1865†Forbes, Duncan, of Culloden, Inverness
 1874 Fraser, Alexander, Commercial Bank, Inverness
 1857 Fraser, Alex., Sheriff-Substitute, Portree

Admitted

- 1893 Fraser, Andrew, Ashton, Inverness
 1888 Fraser, David, Dalneigh, Inverness
 1889 Fraser, Donald, of Millburn, Inverness
 1858 Fraser, Hugh, Balloch of Culloden, Inverness
 1874 Fraser, James, C.E., Inverness
 1874 Fraser, James, Mauld, Beaully
 1865 Fraser, William, Annfield, Inverness
 1893 Garland, William, Balmacasn, Glen Urquhart
 1892 Garrioch, J. T., Lovat Estates Office, Beaully
 1885 Gordon, James G., Elmwood, Inverness
 1886 Grant, John Brown, Erchless, Beaully
 1874 Grant, Major Wm., Drumhale, Glen Urquhart
 1888 Grant, Wm. R., Solicitor, Inverness
 1854 Gregory, A. A., of Westwood, Inverness
 1875 Guild, James L., Strowan, Inverness
 1882 Gunn, Alex., V.S., Beaully
 1886 Honeyman, Thos., Auchnacarry, Fort-William
 1865 Howden, John, Inverness
 1888 Howe, Thos., Parks of Inshes, Inverness
 1875 Hugonin, R., Kinnylies House, Inverness
 1874 Innes, Charles, Solicitor, Inverness
 1883 Jones, R. E., Glenmoidart, Salen
 1874 Kelman, William, Wester Lovat, Beaully
 1880 Kemble, Major, Knock, Skye
 1890 Kennard, Cecil, Toimore, Broadford, Skye
 1888 Laurie, Robert, Eilean Cottage, Drumnurn, Inverness
 1884 Lawson, Robt., Beaufort Farm, Beaully
 1853 Lawson, Wm., 13 Ardenconel Terrace, Inverness
 1891 Linton, Andrew, Inchree, Onich, N.B.
 1892 MacAlinsh, John, Congash, Grantown
 1891 Macallister, Thomas S., Inverness
 1878 MACANDREW, Sir Henry C., The Castle, Inverness
 1892 M'Bain, Wm., Pittersald, Drumnadrochet
 1883 M'Bean, Wm., Cradle Hall, Inverness
 1889 Maccoll, Rev. Canon Hugh, Rosse Parsonage, Fort-William
 1841 Macdonald, Alex., Wine Merchant, Inverness
 1888 Macdonald, Alex., Balintore, Bogroy
 1884 M'Donald, Alex., Portree
 1874 Macdonald, A. R., Ord, Isle of Ornsay
 1883 Macdonald, Allan, Solicitor, Inverness
 1888 M'Donald, Charles, Knocknagael, Inverness
 1898 M'Donald, D. D., Drumnadrochet, Glen Urquhart
 1889 Macdonald, Hugh, Coach Proprietor, Fort-William
 1891 Macdonald, J. H., Charleston, Inverness
 1846 Macdonnell, E. R., of Morar, Fort-William
 1893 Macdonnell, James, Sidgreaves, Camusdaroch, Morar, Arisaig
 1865 MacEwen, John C., Inverness
 1879 M'Gillivray, Allan, Gordon Hall, Kingussie
 1892 M'Gillivray, Hugh, Cattle-dealer, Inverness
 1874 M'Gillivray, John, Ballachroan, Kingussie
 1876 MacGillivray, William, Eoligary, Barra
 1877 M'Gregor, Archd., Glenforlan, Salen, Ardour
 1891 M'Intosh, Charles, Craggie, Inverness
 1889 M'Intosh, Donald, West End Hotel, Fort-William
 1889 MacIntosh, James, Factor, Ostaig, Isle Ornsay, Skye
 1898 M'Intyre, John, Ballintomb, Grantown
 1879 Mackay, G. Grant, of Glengloy, Kingussie

Admitted

- 1875 Mackenzie, Alexander, Silverwells, Inverness
 1878 Mackenzie, Alex., Banker, Beaully
 1891 Mackenzie, Dr Murdo T., Scolpaig, North Uist
 1874 Mackenzie, N. B., British Linen Bank, Port-William
 1886 Mackenzie, Wm. D., of Farr, Inverness (Fawley Court, Henley-on-Thames)
 1883 Mackintosh, A. D., of Mackintosh, Moy Hall, Inverness
 1886 Mackintosh, C. Fraser, of Drummond, M.P., Inverness
 1846 Mackintosh, Æneas, of Balmespick, Inverness
 1844 Mackintosh, Æneas W., of Raigmore, Inverness
 1844 Mackintosh, A., of Holme, Inverness
 1883 Mackintosh, Hugh, Ironmonger, Inverness
 1875 Maclean, Charles, Milton, Lochmaddy
 1875 M'Leish, Daniel, Bank of Scotland, Port-William
 1898 M'Lennan, Alex., Beechwood, Inverness
 1830 Macleod, Norman, of Macleod
 1883 M'Millan, E. H., Caledonian Bank, Inverness
 1878 Macpherson, C. J. B., of Beleville, Kingussie
 1887 Macpherson, Col. Ewen, of Oluny Macpherson, Kingussie
 1870 Macpherson, Colonel Lachlan, of Glen-truin, Newtonmore
 1888 Macpherson, L. A., of Corrimony, Inverness
 1883 Macrae, Alex. D., Ruthven, Kingussie
 1874 Macrae, D. A., Tighary, North Uist, Lochmaddy
 1891 Macrae, Horatio Ross, W.S., of Clunes, Inverness (57 Castle St., Edinburgh)
 1874 Macrae, Roderick, Mains of Erchless, Beaully
 1888 MacTavish, Alex., Implement Maker, Inverness
 1892 M'Tavish, Dun., High Street, Inverness
 1869 Malcolm, George, Craighard, Invergarry
 1892 Malcolm, John, Craighard, Invergarry.
 1888 Manners, C. R., C.E., Inverness
 1884 MARJORIBANKS, Hon. Edward, M.P., yr. of Gulschan, Beaully
 1883 Marr, Alex., Dalcross, Fort - George Station
 1865 Martin, John, Docharn, Boat of Garten, Strathspey
 1889 Martin, Nicol, of Glendale, Dunvegan
 1883 Merry, A. W., of Belladrum, Beaully
 1888 Merry, C. J., Belladrum, Beaully
 1874 Mitchell, Andw., Royal Bank Buildings, Inverness
 1874 Mundell, John, Tarradale, Muir of Ord
 1884 Munro, D., Milton, Fort-George Station
 1874 Munro, John, Seedsman, Inverness
 1892 Murray, Francis, Butcher, Inverness
 1890 Nicholson, Arthur Wm., Arisaig House, Port-William
 1887 Orde, A. G. Campbell, yr. of Kilmory, Newton, Lochmaddy
 1883 Paterson, Donald, Askernish, South Uist, Oban
 1891 Paterson, Donald, Milton, Culloden, Inverness
 1854 Peter, John, Croyard, Beaully
 1888 Roberts, Wm., Dell of Inches, Inverness
 1888 Roberts, Wm., Highland Railway Co., Inverness
 1874 Robertson, John, of Grishernish, Portree
 1892 Robertson, John, Auctioneer, Inverness
 1890 Rose, Hugh Francis, of Holme Rose, Fort-George

Admitted

- 1865 Ross, James, Mains of Connago, Fort-George Station
 1895 Ross, John, Leanach, Inverness
 1883 Ross, Alex., Architect, Inverness
 1874 Ross, Duncan, Hilton, Inverness
 1865 Ross, George, Owen Cottage, Ballifeary Road, Inverness
 1893 Ross, Hugh, V.S., Inverness
 1883 Ross, James, Solicitor, Inverness
 1883 Ross, Wm., Seafeld of Raigmore, Inverness
 1892 Scott, David, Auctioneer, Inverness
 1890 Shaw, Alexander, Farraline Mains, Inverness
 1883 Shaw, Duncan, W.S., Inverness
 1891 Sinton, P. J., Glennevis, Fort-William
 1865 Smith, John, Inverallan House, Grantown
 1892 Stewart, C. D., of Brin, Inverness
 1884 Stewart, D. A., Ensay, Obbe
 1862 Stewart, John, of Ensay, Scorrybrock, Portree
 1883 Stirling, John, of Fairburn, Beaully
 1883 Stuart, W. G., Inverness
 1867 Swinburne, Captain, R.N., of Eilan Shona, Strontian
 1883 Thomson, David, V.S., Inverness
 1874 Thomson, J. Grant, Grantown, Strathspey
 1875 Trotter, R., Garguston, Muir of Ord
 1856 TWSEDMOUTH, Right Hon. Lord, Guisachan House, Beaully
 1883 Tytler, Edward G. F., of Aldourie, Inverness
 1889 Urquhart, Farquhar, Seedsman, Inverness
 1875 Walker, Geo. A., Torbreck, Inverness
 1883 Walker, George, Wood Merchant, Inverness
 1886 Watson, James, 29 Southside Road, Inverness
 1891 Weir, James, Achnasaul, Fort-William

NAIRN.

- 1856 Anderson, Robert, of Lochdhu, Nairn
 1883 Brodie, Cathness, The Drulin, Nairn
 1892 Brown, Gilbert, Midcoul, Fort-George Station
 1873 Cameron, Dr James Angus, of Firhall, Nairn
 1839 Cawdor, Right Hon. The Earl of, Cawdor Castle, Nairn
 1891 Clark, James, Galford, Nairn
 1883 Clarke, Lieut.-Col. M. A., Achareidh, Nairn
 1864 Crawford, John, Nairn
 1883 Donaldson, H. T., Banker, Nairn
 1891 Fiddes, George, Drumduan, Nairn
 1892 Finlay, R. B., of Newton, Q.C., Nairn
 1893 Fraser, Major, Dunlichtly, Strathnairn, Nairn
 1839 Fraser, Robert, Brackla, Nairn
 1852 Fraser, William, of Kilmuir and Newton, Nairn
 1865 Joss, John, Budgate, Cawdor
 1872 Macdonald, Donald, The Park, Nairn
 1874 MacGregor, R., Fern Cottage, Nairn
 1886 M'Intyre, Donald, Meikle Kildrummie, Nairn
 1888 Mackillochan, P., Achagour, Nairn
 1891 M'Lennan, Alex., Milton of Kilravock, Nairn
 1891 M'Lennan, James, Fornightly, Nairn
 1891 Malcolm, William, Househill, Nairn
 1874 Mather, John Arres, Delnies, Nairn
 1891 Methven, Edward W., Heathmount, Nairn
 1886 Mill, George, Piperhill, Nairn

Admitted

- 1873 Robertson, John S., Cawdor Estate Office, Nairn
1805 Rose, Major James, of Kilravock, Fort-George Station
1892 Smith, Alex., Cautraydown, Fort-George Station
1880 Walker, John Mackintosh, of Geddes, Nairn

ORKNEY AND SHETLAND.

ORKNEY.

- 1854 Burroughs, Lieut-General F. W. Trall, C.B., of Rousay
1870 Cromarty, William, Widewall, So. Ronaldshay
1872 Drever, Jas., Swanny House, Finstown
1884 Fortescue, Wm. I., Swanbister, Kirkwall
1875 Gibson, John, Langskail, Rousay
1888 Hossack, B. H., Oringiesfield, Kirkwall
1879 Johnstone, James, Orphir House, Orphir
1878 Learmonth, D. H., Housebay, Stronsay
1877 Leitch, Simon, Elwickbank, Shapinsay
1887 Maxwell, Henry, How, Sanday
1884 Reid, Alfred, Braebuster, Kirkwall
1884 Scarth, Robert, Binscarth, Kirkwall
1886 Sinclair, Thomas, Whitehall, Stronsay
1884 Stephen, Donald, Northtown, Birsay
1877 Stevenson, William, Holland, Stronsay
1887 Thomson, Wm. D. S., Newark, Sanday
1878 Watt, W. G. T., Kierfield House, Stronness

SHETLAND.

- 1884 Anderson, Gilbert, Hillswick, Lerwick
1868 Bruce, John, of Sunburgh, Lerwick
1892 Edmondston, Laurence, Hallegarth, Baltasound, Lerwick
1875 Edmondston, Mrs., of Bunes, Unst, Lerwick
1892 Ganson, Robert D., Lerwick
1874 Hamilton, W. Cameron, Baltasound, Unst
1881 Hamilton, Zachray Macaulay, Symbister
1876 Jaffray, James, Belmont, Unst
1886 Manson, Anderson, Laxthir, Lerwick
1891 Manson, Peter, Lunna, Shetland
1892 Pottinger, Sinclair, Grimsta, Lerwick
1876 Sandison, Alexander, Uyasound, Unst

ROSS AND CROMARTY.

- 1855 Adam, Aeneas, Humberston, Dingwall
1893 Adam, Hugh R., Balvaird, Muir of Ord
1870 Allan, William, Drummondreoch, Ferrintosh, Conon Bridge
1883 Anderson, T. A., Ballachraggan, Alness
1892 Arras, Walter, Fudderty, Dingwall
1889 Bell, William James, of Scatwell, Muir of Ord
1864 Bethune, Murdo, Bree, Dingwall
1892 Bignold, Arthur, of Loch Rosque, Achnasheen
1886 Brown, Stephen, Killilan, Lochalsh
1887 Brown, Rev. W. L. Wallace, The Manse, Alness
1888 Cameron, Archd., Killen, Avoch
1888 Cameron, Colin M., Balnakyle, Munlochy
1869 Cameron, Duncan, Banker, Tain
1881 Cameron, Duncan, Fettes, Muir of Ord
1865 Darroch, Duncan, of Gourrock Torridon, Achnasheen
1861 Douglas, Thomas, Mains of Rhyunie, Fearn
1874 Douglas, William, Arboll, Fearn
1892 Duncan, William J., Solicitor, Dingwall

Admitted

- 1884 Fletcher, J. D., of Rosehaugh, Inverness
1855 Forsyth, John, Auchoyla, Parkhill
1888 Fowler, J. A., yr. of Braemore, Inverbroom House, Garve
1886 Fraser, John G., Easter Barichie, Fearn
1892 Gallie, Abner, Morangie, Tain
1874 Goodbrand, James H., Culnaha, Nigg
1874 Gordon, J. A., of Arabella, Nigg
1875 Goidun, John, Cullissa, Nigg
1874 Grant, George, Pollo, Invergordon
1853 Grant, Kenneth, Craigellachie, Strathpeffer
1891 Grant, Peter, Factor, Fortrose
1892 Gunn, John, of Aldie, Tain
1875 Gunn, William, Strathpeffer, Dingwall
1874 Hall, John, Tomich, Invergordon
1888 Henderson, James, Culcairn, Invergordon
1884 Henderson, John, Factor, Fortrose
1889 Henderson, Thomas, Assistant Factor, Fortrose
1879 Inglis, George, of Newmore, Invergordon
1885 Jackson, Major Randle, of Swordale, Evanton
1892 Linton, John, Castle Craig, Nigg
1888 Littlejohn, Alex., of Invercharron, Ardgay
1892 Lovat, Lord, Beaufort Castle, Beaully
1880 Lumsden, John Wm., Navy, Cromarty
1892 M'Callum, Geo., Cattle-salesman, Dingwall
1892 Macdonald, Alex., Balnagown, Parkhill
1874 MacGregor, James G., Fearn
1875 MacIntyre, Robert, St Martins, Conon Bridge
1875 M'Intyre, P. B., Mains of Findon, Conon Bridge
1877 Mackay, Henry, Shandwick Mains, Nigg
1892 MACKENZIE, Sir A. G. Ramsay, of Coul, Bart., Strathpeffer
1872 Mackenzie, Andw., Dalmore Distillery, Alness
1888 Mackenzie, Colin Lyon, of St Martins, Braelangwell, Invergordon
1865 Mackenzie, James Fowler, of Allan-grange, Munlochy
1854 MACKENZIE, Sir Kenneth S., of Garloch, Bart., Conon House
1892 Mackenzie, Murdo, Banker, Invergordon
1888 Mackenzie, Wm., Delny, Delny Station
1883 Mackenzie, William, Kinnairdie, Dingwall
1892 Mackintosh, D., Auction Mart, Dingwall
1888 Maclean, Roderick, Ardross, Alness
1875 MacLennan, Alexander, Leanasie, Lochalsh
1888 M'Rae, Ewen M., Kinbeachie, Conon Bridge
1878 MacRae, Donald, Moultaivie, Alness
1887 MATHESON, Sir Kenneth J., of Ardross, Bart., Alness
1892 Meiklejohn, John J. R., Novar, Evanton
1881 MIDDLETON, Lord, Applecross, Lochcarron
1875 Middleton, A. A., Rosefarm, Invergordon
1864 Middleton, George, Cornton, Dingwall
1872 Middleton, Jon., Davidson, Invergordon
1872 Middleton, Jon., Clay of Allan, Fearn
1889 Middleton, T. H., Rosefarm, Invergordon—*Free Life Member*
1875 Mitchell, Andrew, Ratagan House, Lochalsh
1851 Munro, David, of Allan, Tain
1881 Mundell, Walter, Moy, Muir of Ord
1870 Mundell, W. G., Inverisla, Lochbroom
1888 Munro, Sir Hector, of Foulis, Bart., Dingwall
1877 Munro, John, of Lamlair, Dingwall

Admitted

- 1892 Munro, Stuart C., of Teanahich, Alness
 1891 Murdoch, Alex., Dalnavie, Alness
 1876 Murdoch, James, Drynie Mains, Inverness
 1884 Murray, Charles, of Lochcarron, Dingwall
 1864 Murray, D., Gruinard, Poolewe
 1883 Murray, William, Bellfield, Inverness
 1887 Murray, William, Kileoy, Killearnan
 1874 Paterson, Wm. G., Ord, Invergordon
 1870 Peterkin, W., Dunglass, Conon Bridge
 1864 Pirie, A. G., of Leckmelm, Ullapool
 1884 Reid, N., New Kelso, Strathcarron, Ross-shire
 1869 Robertson, Chas., of Kindeace, Invergordon
 1898 Robertson, James, Ankerville, Nigg
 1874 Robertson, John, Mountegle, Fearn
 1873 Robertson, Peter, Achilty, Strathpeffer
 1892 Ross, Lady, of Balnagown, Parkhill
 1864 Ross, David, Banker, Dingwall
 1872 Ross, George, Merchant, Dingwall
 1876 Ross, James, Balblair, Edderton
 1874 Ross, John, Melkie Tarrel, Fearn
 1884 Ross, William, Kinnahaird, Strathpeffer
 1887 Ross, W. C., of Cromarty
 1889 Scott, James, Balmaduthy, Munlochy
 1892 Scott, James, Seafield, Portmahomack
 1892 Shoolbred, Walter, of Wyvis, Evanton
 1864 Smith, Alexander P., Munlochy Farm, Munlochy
 1892 Stewart, William, Alness Ferry, Resolis, Invergordon
 1891 Stirling, Captain William, yr. of Fairburn, Balavil House, Conon Bridge

Admitted

- 1888 St Quintin, Geoffray Aspley, Cromarty
 1891 Walker, William, Contullich, Alness
 1868 Warrand, Major A. J. C., Ryefield, Ferintosh
 1892 Wilson, Hugh, Milton of Noth, Rhynie
 1876 Young, James, Caddboll, Fearn

SUTHERLAND.

- 1865 Barclay, Thomas, Skelbo Castle, Dornoch
 1876 Blake, John, Dalchork, Lairg
 1876 Brelner, Robert, Skibo Mains, Dornoch
 1884 Cameron, Alexander, Drumuie, Golspie
 1883 Clarke, G. G., Eriboll, Lairg
 1856 Dudgeon, John B., Crakaig, Loth
 1883 Flower, Charles E., of Glencassley, Rosehall
 1892 Gilchrist, John R., of Ospisdale, Dornoch
 1856 Gunn, Alexander, Achley, Dornoch
 1883 Gunn, John, The Hermitage, Golspie
 1861 Hill, Robert, Navidale House, Helmsdale
 1874 Hill, Robert Robertson, Navidale House, Helmsdale
 1854 Houstoun, Wm., Kintradwell, Brora
 1890 Mackintosh, John, Proncy, Dornoch
 1850 M'Iver, Evander, Scourie House, Lairg
 1888 McLean, Donald, Dunrobin, Golspie
 1847 Marshall, John, Clebrig, Lairg
 1844 Menzies, Duncan, Blairach, Lairg
 1874 Mitchell, James R., Culgower, Loth
 1863 Mitchell, Wm., Ribigill, Tongue
 1883 Shaw, James T., Gordonbush, Brora
 1885 Urquhart, John, Cambusavie, Dornoch

8.—BORDER DISTRICT.

EMBRACING THE

COUNTIES OF BERWICK, PEEBLES, ROXBURGH, AND SELKIRK.

BERWICK.

Admitted

- 1802 Aitchison, Wm., Kames, West Mains, Leitholm, Coldstream
 1854 Allan, John, Peelwalls, Ayton
 1868 Allan, Robt. A., Allan Bank, Eyemouth
 1874 Bertram, John, Addinston, Lauder
 1854 Bertram, John S., Cranshaws, Duns
 1877 Black, George, Sea-View Works, Berwick
 1866 Bolam, Robt. George, Berwick-on-Tweed
 1885 Boswall, Sir G. Houstoun, of Blackadder, Bart., Chirnside
 1867 Bromfield, W. J., Old Greenlaw, Greenlaw
 1891 Broomfield, George L., Solicitor, Lauder
 1854 Broughton, R. H., of Rowchester, Greenlaw
 1888 Brown, Colonel, Longformacus, Duns
 1872 Brownlie, Alex., Haughhead, Earliston
 1883 Brydon, Thos. T., Burncastle, Lauder
 1884 Calder, T. A., Billie Mains, Reston
 1872 Calder, W. A., Oxenrig, Coldstream
 1884 CAMPBELL, Sir H. Hume, of Marchmont, Bart., Duns
 1880 Carnichael, John, Coldstream
 1860 Chirnside, G., Edrington House, Berwick
 1889 Cookson, C. L. Stirling, Renton, Grant's House
 1884 Cossar, Mark, Greenknowe, Duns
 1872 Cowe, Peter, Butterdean, Grant's House
 1870 Cowe, Robert, Old Castles, Chirnside
 1888 Cranston, Robert, Pathhead, Cockburnspath
 1881 Craw, H. H., West Foulden, Berwick
 1853 Crawford, Alex., Writer, Duns
 1857 Darling, Adam, Governor's House, Berwick
 1883 Darling, James, Priestlaw, Duns
 1880 Darling, Thomas, 1 Palace Street East, Berwick
 1887 Deas, Adam, Briery Bank, Duns
 1882 Dickenson, Robert, Longcroft, Lauder
 1850 Dickenson, Wm., Longcroft, Lauder
 1891 Dodds, Robt., Blackadder Bank, Chirnside
 1883 Dodds, William, Elwartlaw, Greenlaw
 1863 Dryden, William, Coldstream
 1884 Dunn, James, Blainslie, Lauder
 1880 Edington, Wm., Dowlaw, Coldingham, Ayton
 1854 Elder, W., Implement Werks, Berwick-on-Tweed
 1884 Elliot, William, Ellemford, Duns
 1882 Ferguson, J., Duns Castle Estate Office, Duns
 1884 Fulton, John, Hatchednize, Coldstream
 1878 Gibb, Robert Shirra, Boon, Lauder—*Free Life Member*, 1885
 1884 Gibson, J., Fairlaw House, Reston
 1893 Gillies, John, Edington Mills, Chirnside
 1882 Gilroy, James, Berwick-on-Tweed
 1880 Henderson, Robert, East Gordon, Gordon

Admitted

- 1881 Herbertson, Robert H., Fans, Earliston
 1892 Hogg, Robt., Fireburn Mill, Coldstream
 1854 Hogg, Thomas, Hope Park, Coldstream
 1898 Hogg, Wm., jun., Clackmas, Earliston
 1800 Home, Right Hon. The Earl of, The Hirsell, Coldstream
 1874 Home, Col. D. Milne, of Wedderburn, Paxton House, Berwick
 1880 Hood, James, Cove, Cockburnspath
 1854 Hood, T., Coldstream Mains, Coldstream
 1884 Hood, Thos., Factor, Coldstream
 1877 Hood, W., The Cove, Cockburnspath
 1879 Hope, A. Peterkin, Sunwick, Berwick
 1886 Hope, Col. Charles, of Cowdenknowes, Earliston
 1876 Hunter, Jas., of Antonshill, Coldstream
 1892 Inglis, Alex., Greenlawdean, Greenlaw—*Free Life Member*
 1857 Johnston, James, Huntingdon, Lauder
 1872 Kynoch, Dr Patrick, Greenlaw
 1886 Laurie, John H., Hardans, Duns
 1884 Leadbetter, H. M., Legerwood, Earliston
 1860 Lockie, William, Choichelee, Duns
 1884 Logan, Adam S., Ferney Castle, Reston
 1876 Logan, J. W., M.I. Mech. E., Berwick
 1872 Loney, Peter, Marchmont, Duns—*Free Life Member*, 1892
 1868 Macbraire, J., of Broadmeadows, Berwick
 1891 M'Donald, Dan., Hawkshaw, Coldstream
 1888 M'Dougal, George, Blythe, Lauder
 1891 M'Dougal, James, Lylestone, Lauder
 1885 M'Lean, David, Estate Office, The Crooks, Coldstream
 1881 Mack, Joseph, Berrybank, Reston
 1870 Menzies, John, Bankhead, Duns
 1892 Menzies, John C., Bankhead, Duns—*Free Life Member*
 1884 Middleton, Hilton, Kimmerghame Mains, Duns
 1889 Millican, Gilbert T., Harelaw, Chirnside
 1872 Muirhead, Frank, Paxton, Berwick
 1888 Nisbet, Alex., Marigold, Edrom, Duns
 1880 Nisbet, George, Rumbledon, Greenlaw
 1870 Nisbet, Jas., of Lambden, Greenlaw
 1872 Paterson, James, Kildahielhaugh, Duns
 1880 Porteous, James, Solicitor, Coldstream
 1872 Rae, Robt., Burnbank, Foulden, Berwick
 1878 REAY, The Right Hon. Lord, Carolside Earliston
 1884 Renwick, G. J., Corsbie, Earliston
 1892 Robertson, William, Blinckbonny, Earliston—*Free Life Member*
 1872 Robeson, George, Springwells, Coldstream
 1868 Romanes, Robert, of Harryburn, Lauder
 1872 Rutherford, A., Rumbledon Law, Gordon
 1872 Scott, Peter, Whiterig, Ayton
 1868 Scott, T., of Mersington, Leitholm, Coldstream

Admitted

- 1890 Scott, Thomas, Abbey St Bathans,
Grant's House
1872 Shiel, Andrew, Coldstream
1861 Simson, George, Courthill, Kelso
1868 Smith, Alex., Letham, Berwick
1890 Smith, Andrew, of Whitehester, Duns
1864 Smith, F. C., Hoprig, Cockburnspath
1872 Smith, J. F., Darnhester, Coldstream
1880 Somervell, J. A., Broomdykes, Chirnside
1874 Stephenson, Richard, Chapel, Duns
1884 Swan, Robert G., Duns
1880 Swinton, J. L. Campbell, of Kimmer-
ghame, Duns
1855 Thomson, James, Mungoswalls, Duns
1863 Torrance, George, Leetside, Chirnside
1863 Torrance, T., Laws, Whitsome
1884 Tweedie, David, Nether Howden, Lauder
1877 Weatherhead, Wm., Preston, Duns
1863 Weddell, John Wilkie, Lauder Barns,
Lauder
1885 Welsh, Alex., Seedsman, Coldstream
1865 White, A., Kelloe Mains, Edrom
1880 White, E. C., Ayton Law, Ayton
1872 White, Wm., Lennel Hill, Coldstream
1872 Wight, R. B., Beclaw, Cockburnspath
1889 Wilkie, Jas. Bruce, of Foulden, Berwick
1862 Wilson, J., Chapelhill, Cockburnspath
1867 Wilson, Philip, Corn Factor, Duns
1874 Wyllie, James, Pathhead, Cockburnspath

PEEBLES.

- 1878 Anderson, John, Cramalt, Coppercleuch,
Selkirk
1884 Ballantyne, Wm., Wormiston, Eddleston
1882 Beresford, J. G. M., of Macbiehill, La-
mancha
1877 Black, Wm. Connel, of Kailzie, Peebles
1875 Blackwood, Alex., Stobo Mill, Stobo
1872 Brown, Wm., Parkgatestone, Biggar
1884 Cairns, John, Winkston, Peebles
1881 Carmichael, G. H. G., Castle Craig,
Dolphinton
1881 CARMICHAEL, Sir T. D. Gibson, of Skir-
ling, Bart., Castle Craig
1874 Dickson, W. L., Drumelzier Haugh,
Biggar
1884 Dyson, F. W., Crossburn, Peebles
1874 ELIZABETH, Right Hon. Lord, Minden,
Eddleston
1884 Ellis, John, Waterhead, Eddleston
1887 Erskine, Rear-Admiral James E., of Ven-
law, Peebles
1882 FERGUSON, Sir James R., of Spitalhaugh,
Bart., West Linton
1884 Fletcher, D. M., Drumelzier Place, Biggar
1880 Forrest, George, Edston, Stobo
1884 Forrest, T. M., Edston, Stobo
1876 Gordon, Charles, of Hallmyre, Lamancha
1884 Grace, Charles A., Easter Haprow,
Stobo
1882 Greenshields, Dav., Garvald, Dolphinton
1880 Harper, J., Traquair Mains, Innerleithen
1882 HAY, Sir John Adam, of Haystoun,
Bart., Kingsmeadows, Peebles
1892 Herdman, Geo., The Glen, Innerleithen
1873 Linton, Simon, Glenrath, Manor
1869† Mackenzie, C. J., of Portmore, Eshiels,
Peebles
1848 MONTGOMERY, Sir G. Graham, of Stan-
hope, Bart., Stobo Castle, Stobo—
Honorary Secretary of the Society
1846 Montgomery, John B. H., Stobo Castle,
Stobo
1862 Muir, G. W., Kirkhouse, Traquair
1884 Murray, W. J., Dawyck, Stobo
1869 Newbigging, Thomas, Corstane, Biggar
1882 Paterson, J., South Slipperfield, West
Linton

Admitted

- 1881 Ritchie, G. D., Cloverhill, Biggar
1885 Slater, Andrew, Haystoun, Peebles
1844 Stewart, G., Kerfield Cottage, Peebles
1880 Stodart, Thomas Tweedie, of Oliver,
Rachan Mill, Biggar
1858 TENNANT, Sir Chas., of The Glen, Bart.,
Innerleithen
1890 Tennant, Edward P., yr. of The Glen,
Innerleithen
1877 Thom, Alex., Chapelhill, Peebles
1886 Thorburn, M. G., of Glenormiston, Inner-
leithen
1880 Thorburn, William, Craigerne, Peebles
1878 Tweedie, A. G., Hearlstone, Broughton,
Peebles
1860 Tweedie, James, of Quarter, Biggar
1887 Watson, James, Blyth-Bank, Dolphinton
1878 Williamson, Miss Katharine Isabella, of
Cardrona, Peebles
1859 Wilson, J. F., Newton Villa, Peebles
1881 Wilson, James, Burnetland, Biggar
1884 Wilson, James, West Mains, Dolphinton
1800 Woddrop, W. A., of Garvald, Dolphinton

ROXBURGH.

- 1872 Alexander, George, Easter Lilliesleaf, St
Boswells
1884 Ballantyne, David, Shaws, Newcastleton
1860 Ballingall, George, Clarlaw, St Boswells
1868 Balmer, Thomas, Melrose
1863 Barrie, James, Harden Mains, Jedburgh
1886 Beattie, John, Braidlie, Newcastleton
1867 Bell, Alex., Yetholm, Kelso
1885 Bell, Wm. Scott, yr. of Woll, Hawick
1881 Blackie, Wm. L., Holydean, St Boswells
1859 Borthwick, A. H., Ladiesyde Lodge,
Melrose
1889 Boyd, Andrew, F.R.C.V.S., Melrose
1861 Boyd, John B., of Cherrytrees, Kelso
1868 Boyd, W. B., of Faldonside, Melrose
1880 Broad, Anthony, Edenside Road, Kelso
1880 Brown, J., East Housebyres, Galashiels
1884 Brown, James, Land Steward, Floors,
Kelso
1880 Brown, Thomas, Carpenter, Melrose
1866 Brunton, James, Broomlands, Kelso
1862 Brydon, Adam, Mounthooly, Jedburgh
1863 Burn, John, Newhouse, Yetholm
1872 Calder, Adam, Halterburn, Kelso
1853 Calder, Francis, Yetholm Mains, Kelso
1876 Carre, T. A. R., of Caverscarre, St Bos-
wells
1871 Caverhill, John, Jedneuk, Jedburgh
1867 Charlton, M., jun., Brownleanlaws,
Jedburgh
1884 Clark, S. T., Chapelhill, Hawick
1854 Clay, John, Kerchesters, Kelso
1880 Cochran, A. L., of Kingsknowe, Gal-
ashiels
1872 Croall, John, Coach Works, Kelso
1872 Cunningham, C. J., of Muirhouselaw,
Wooden, Kelso
1884 Cunningham, Robt., Glendouglas, Jed-
burgh
1889 Curle, Alexander, of Priorwood, Melrose
1865 DALRYMPLE, Hon. G. Gray, Ellistoun
House, St Boswells
1889 Davidson, Alexander, Auctioneer, Mel-
rose
1879 Davidson, Gilbert, Banker, Hawick
1872 Davidson, Wm., Colmslie, Galashiels
1890 Davidson, Wm., Cattle-salesman, Jed-
burgh
1854 Dickson, A., of Hassendeanburn, Hawick
1868 Dodd, James, Hundalee Cottage, Jed-
burgh
1868 Dodd, Nicholas, Nisbet, Jedburgh
1880 Douglas, Francis, Springwood Park, Kelso

Admitted

- 1867 DOUGLAS, Sir George B., of Springwood Park, Bart., Kelso
 1871 Douglas, George, Upper Hindhope, Jedburgh
 1867 Douglas, George Sholto, 5 Abbotsford Grove, Kelso
 1862†DUDGSON, J. Scott, Longnewton, St Boswells
 1870 Dunn, John, Ramsay Lodge, Kelso
 1880 Elliot, James, Burnhead, Hawick
 1868 Elliot, John, The Flat, Newcastleton
 1874 Elliot, Robert Henry, of Clifton Park, Kelso
 1866 Elliot, Walter, Hermitage, Newcastleton
 1872 Elliot, Wm. B., of Benrig, St Boswells
 1878 Erskine, Charles, Melrose
 1884 Fairbairn, J. J., Greenend, St Boswells
 1889 Fairfax, Rear-Admiral Henry, C.B., of Old Melrose
 1884 Fleming, John, Roan, Newcastleton
 1872 Forsyth, James (Hooper & Co.), Kelso
 1855 Gardner, Robert, Gattonside, Melrose
 1848 Gibson, Thomas, Haymount, Kelso
 1884 Grierson, Robert, Whitechesters, Hawick
 1878 Grievie, C. J., Branxholm Park, Hawick
 1890 GRIFFITH, Sir Richard Waldie, of Hendersyde Park, Bart., Kelso
 1857 Haddon, Andrew, Honeyburn, Hawick
 1880 Haddon, Walter, Solicitor, Hawick
 1889 Halliburton, J. H., Jed Bank, Jedburgh
 1889 Hamilton, George, Abbey Hotel, Melrose
 1892 Hay, Athole S., of Marfield, Roxburgh
 1889 Henderson, James, Eldon Mains, St Boswells
 1868 Hilson, George, Solicitor, Jedburgh
 1862 Hobkirk, James, Broadhaugh, Hawick
 1889 Hutton, John, V.S., Kelso
 1887 Johnston, John S., Crailinghall, Jedburgh
 1889 Johnston, Wm. Lea, Oxnam Neuk, Jedburgh
 1890 Karr, H. Seton, of Kippislaw, St Boswells
 1871 Kay, Robert, Softlaw, Kelso
 1838 Korr, W. S., of Chatto, Sunlaws, Kelso
 1890 Kidd, Henry, Lowood, Melrose
 1868 Laing, George, Tweedbank, Kelso
 1880 Laing, Thomas (Laing & Mather), Kelso
 1880 Laing, Walter, Hawick
 1872 Lawrie, Thomas, Ormiston Road, Melrose
 1863 Lees, Richard, Drinkstone, Hawick
 1893 Logan, Somner, Harrietfield, Kelso
 1860*†LOTHIAN, The Marquis of, K.T., Monteviot, Jedburgh
 1883 Macpherson, Donald, Wolfdale, Hawick
 1880 Maxwell, John, Coachbuilder, Kelso
 1892 Mein, James A. W., Henthill, Jedburgh
 1886 Moffat, James, Craik, Hawick
 1868 Murray, John, of Woollaw, Galashiels
 1889 Noble, Robt., of Borthwickbrae, Hawick
 1840 Ogilvie, George, Holfield, Kelso
 1886 Oliver, Andrew R., Thornwood, Hawick
 1889 Oliver, Geo. Lindsay, Whithaugh, Newcastleton
 1852 Oliver, James, of Thornwood, Hawick
 1880 Oliver, John, Borthaugh, Hawick
 1853 Oliver, Robert, of Blakelaw, Lochside, Kelso
 1873 Oliver, Wm. M., Howpasley, Hawick
 1889 Paton, Major James, of Crailing, Jedburgh
 1898 Peter, John Stewart, Lintalee, Jedburgh
 1863*†POLWARTH, Right Hon. Lord, Mertoun, St Boswells
 1889 POLWARTH, The Hon. The Master of, Mertoun, St Boswells (Humble House, Upper Keith)

Admitted

- 1854 Pott, Gideon, of Dod, Knowesouth, Jedburgh
 1856 Rawdin, Joseph, Chemist, Jedburgh
 1863 Rea, Charles, Cleithaugh, Jedburgh
 1872 Renwick, John, Nurseryman, Melrose
 1889 Robertson, John, Borthwickbrae, Hawick
 1863 Robertson, John, Falside, Stithill, Kelso
 1863 Robertson, Robert, Ladyrig, Kelso
 1889 Rodger, James, Minto Estate Office, Hawick
 1880 Ross, Richard, Rutherford, Kelso
 1884 Rutherford, W. E. Oliver, of Edgerston, Jedburgh
 1889 SCOTT, The Hon. H. J., Mertoun, St Boswells
 1883 SCOTT, Hon. J. C. Maxwell, of Abbotsford, Melrose
 1884 Scott, Chas., Milsington, Hawick
 1868 Scott, George, Kersknowe, Kelso
 1882 Scott, H. J. B., of Makerston, Kelso (Weston, Underwood, Derby)
 1868 Scott, J. S. E., Kirnecan, Newcastleton
 1881 Scott, John Corse, of Synton, Hawick
 1889 Scott, John Robson, yr. of Newton, Jedburgh
 1868 Scott, Robert, Falside, Hawick
 1863 Scott, T., of Mersington, Leitholm, Coldstream
 1840 Scott, T. Robson, of Newton, Jedburgh
 1863 Scott, W., Mervinslaw, Jedburgh
 1863 SCOTT, Sir W., of Ancrum, Bart., Jedburgh
 1883 Sinclair, C. G., Grahamslaw, Kelso
 1870 Smith, James, Kelso
 1880 Smith, John, Galalaw, Kelso
 1868 Smith, J. R. C., Mowhaugh, Kelso—Free Life Member
 1881 Smith, R. C., Ormiston, Jedburgh
 1887 Smith, Thomas A., Kirkton, Hawick
 1888 Sprot, Edward William, of Drygrange, Melrose
 1887 Sprot, Lieut.-General John, of Riddell, Lilliesleaf
 1872 Staver, Archd., of Hoscote, Hawick
 1851 Stedman, James, Timpensdean, Jedburgh
 1880 Storie, W. G. R., Lanton, Jedburgh
 1880 Tait, George, Venchen, Yetholm
 1846 Tait, James, Banker, Kelso
 1867 Thomson, A., of Mainhill, St Boswells
 1868 Thomson, Geo., Hopton, Ancrum, Jedburgh
 1889 Thomson, William, Whitelee, St Boswells
 1863 Turnbull, J., Eastfield, Kelso
 1889 Turnbull, Mark, Melrose
 1893 Turnbull, W. Geo., Spittal, Jedburgh
 1868 Turnbull, Wm. J., Beaumont Cottage, Sprouston
 1853 Usher, John, Kelso
 1872 Usher, Thomas, jun., Courthill, Hawick
 1880 Waddell, Alexander, of Palace, Jedburgh
 1880 Watson, T. Lindsay, Seaburn, Hawick
 1886 Watson, Capt. W. S., of Burnhead, Hawick (care of T. Usher, Courthill, Hawick)
 1890 White, Alex., Nottylee, Kelso
 1863 Wilson, George, Kilmany, Hawick
 1864 Wood, James, Whitehill, Stithill, Kelso

SELKIRK.

- 1866 Anderson, B. T. G., of Tushielaw, Selkirk
 1868 Anderson, G., of Hawthorn Bank, Selkirk
 1889 Anderson, S. Scott, of Shaws, Selkirk
 1868 Brown, Adam, Hyndhope, Selkirk
 1889 Brown, James, Ashwood, Galashiels

Admitted

- 1867 Brunton, J S, of Hiltonshill, Ladhope House, Galashiels
 1891 Cairns, Thos M, Ramsaycleugh, Selkirk
 1889 Connochie, Thomas D, V S, Galashiels
 1877 Connochie, William Dixon, V S, Selkirk
 1877 Dennistoun, J W, of Dennistoun, Harewood Glen, Selkirk
 1871 Dun, John, Galashiels
 1889 Elliot, A T, Newhall, Galashiels
 1889 Elliot, John, Maigle, Galashiels
 1854 Elliot, Thomas, Blackhaugh, Galashiels
 1860 Elliot, Walter, Hollybush, Galashiels
 1889 Gibson, Thomas, jun, Torwoodlee, Galashiels
 1878 Grieve, James, Howden, Selkirk
 1885 Grieve, James, jun, Fernielee, Selkirk
 1875 Howatson, J L, Ramsaycleugh, Selkirk
 1878 Ludlaw, Robert, Rodono, Selkirk
 1889 Laidlaw, Thomas R, Langshaw, Galashiels

Admitted

- 1849 Lang, Hugh M, of Broadmeadows, Selkirk
 1878 Lang, Robert J, Broadmeadows, Selkirk
 1889 Lawience, David, Whytbank, Galashiels
 1878 Lindsay, John V, Whitehope, Selkirk
 1888 Macfarlane, Jas, Ashiestiel, Galashiels
 1879 M'Queen, John, Oakwood, Selkirk
 1880 Mitchell, Thomas, Howford, Selkirk
 1880 Muir, John, Dryhope, Yarrow, Selkirk
 1848† Napier and Errick, Right Hon Lord, K T, Thulestane Castle, Selkirk
 1885 Plummer, Chas H. S, of Sunderland Hall, Selkirk
 1868 Potts, Andrew, Beechwood, Selkirk
 1859 Pringle, Alex, of Whytbank, Selkirk
 1868 Pringle, J T, of Torwoodlee, Galashiels
 1880 Riddell, John, Runk, Galashiels
 1889 Scott, Alex, Ladhope, Selkirk
 1880 Scott, John, of Gala, Galashiels
 1880 Turnbull, James, Fauldshepe, Selkirk

ENGLAND.

Admitted

- 1835 Alexander, John, 9 Raymond Terrace, Cheltenham
 1878 ANCASTER, The Earl of, Normanton Park, Stamford
 1878 Anderson, J., Bradbury, Enville, Stourbridge
 1850 Anderson, Robert Hood, Devonshire Club, London
 1863 Angus, John, Whitefield, Morpeth
 1804 Archer, Thomas, 1 Westminster Chambers, Victoria Street, London
 1861 Archibald, James, Petre Hall, Coventry
 1873 Ashdown, A. H., Uppington, Wellington, Salop—*Free Life Member*
 1863 Askew, Wilson, of Fallinsburn, Coldstream
 1888 Aveling, T. L., Rochester
 1890 Bamford, Henry, jun., Leighton Iron Works, Uttoxeter
 1880 Barrett, Robert Bell, Skipton Castle, Skipton
 1872 Bell, And., Hilgay, Downham Market, Norfolk
 1860 Bell, Robt., Lyndale Lodge, Needham Market, Suffolk
 1877 Bell, T. (Messrs Robey & Co.), Lincoln
 1884 Benson, R. A., Duchy of Cornwall Office, Liskeard, Cornwall—*Free Life Member*
 1882 Bigg, Thos., Great Dover Street, London
 1885 Birch, W. de Hoghton, Kerry, Montgomeryshire—*Free Life Member*
 1874 Bird, Ebenezer, Ramornie, Kingston, Herefordshire
 1865 Black, Major Alexander, 8 Manor Place, Paddington, London, W.
 1850 Black, John, Ford, Northumberland
 1883 Blackett, J. S., Bongate Hall, Appleby, Westmoreland
 1863 Bolam, John, Bilton, Lesbury, Northumberland
 1879 Bonnor, G. H., 14 Cockspur Street, Pall Mall, London, S.E.
 1878 Boothby, R. C., Dorrington, Shrewsbury
 1864 Burton, John, Barton House, Malton
 1875 Brotchie, G., Grinkle, Loftus, R.S.O.
 1874 Browne, A. H., Duxford Hall, Chathill
 1873 Browne, Colville, 26 Mill Street, Bedford—*Free Life Member*
 1863 Bruce, Robert, Elm Grove, Darlington
 1884 Brydon, John, Seed Merchant, Darlington
 1873 Brydon, Robert, The Dene, Seaham Harbour—*Free Life Member*
 1885 BUCKLEUCH and QUEENSBERRY, The Duchess-Dowager of, Boughton House, Kettering
 1875 Bullock, Matt., 48 Prince's Gate, London, S.W.
 1870 BURDETT-COURTS, Baroness, 1 Stratton Street, Piccadilly, London
 1882 Burton, Dr M. E., Oswald House, Lindley, Huddersfield
 1870 Cairns, John, Fernbank, Heaton Chapel, Stockport
 1873 Cameron, H. E., Newton Leys, Ashbourne, Derbyshire

Admitted

- 1863 Campbell, A. H., Cornwall Gardens, London, S.W.
 1863 Campbell, G. W., 22 Queen's Gate, London, S.W.
 1888 CAMPBELL, Sir James, Bart., Wheatmead Park, Lydney
 1880 Carnegie, Wm. C., Sarsden, Chipping Norton
 1878 Carr, Robt., Felkington, Norham, Berwick-on-Tweed—*Free Life Member*
 1887 Carrington, George, M.R.A.C., Missenden Abbey, Great Missenden, Bucks—*Free Life Member*
 1888 Carstairs, D., Hailes House, Fairfield, Liverpool
 1877† CECIL, Lord Arthur, Orchardmains, Tunbridge
 1877 CECIL, Lord Lionel, Orchardmains, Tunbridge
 1884 Chambers, T. W., Prospect House, Pelutho, Abbeystown
 1846 Christie, J., 10 Pitville Parade, Cheltenham
 1877 Clark, James, Somerby, Grantham
 1884 Clark, J. M., Featherstone Castle, Haltwhistle
 1878 Clark, William, New Mousen, Belford
 1877 Clench, F. (Messrs Robey & Co.), Lincoln
 1884 Clinton, W. E. Pelham, Moore Court, Stroud—*Free Life Member*
 1890 Colquhoun, William E. Campbell, jr. of Killermont, Chesterton Lodge, Hartury, Leamington
 1857 Collyer, W. D., Craig Nethan, Weston-super-Mare
 1851 COLVILLE of Culross, Right Hon. Lord, K.T., 41 Eaton Place, London
 1877 Corbett, T., Perseverance Iron Works, Shrewsbury
 1891 Coward, T. A., Eden Town, Carlisle—*Free Life Member*
 1879 Crabb, Wm., Silloth, Cumberland
 1890 Crabtree, Henry, 54 Wakehurst Road, Clapham Junction, London, S.W.—*Free Life Member*
 1882 Craig, Robert, Crondon Park, Billerician, Essex
 1860 Crawford, Daniel, Potterells Farm, Hatfield, Herts
 1868 Cruikshank, Edward C., Shrublands, Graffham, Petworth, Sussex
 1874 Dallas, A. G., 10 Tervor Terrace, London, S.W.
 1887 Davies, Edward Smith, Claverley, Bridgenorth, Salop—*Free Life Member*
 1859 Dawson, J., Lymore, Montgomery, N. Wales
 1869 Dickie, Joseph, The Bank House, The Broadway, Tooting, London, S.W.
 1886 Dickson, Thos. A., Estate Office, Overstone Park, Northampton—*Free Life Member*
 1849 Dixon, Thomas G., Dolbon, St Asaph
 1880 Dollar, T. A., V.S., 56 New Bond Street, London

Admitted

- 1887 Don, H. G., Ryehills, Marske-by-the-Sea, Yorkshire
 1871 Donne, Henry, Leek Wootton, Warwick
 1873 Douglas, Thomas, 5 Charlotte Square, Newcastle
 1861 Drummond, Hon. F., 58 St George's Square, London
 1874 Duff, G. Smytten, 58 Queen's Gate, South Kensington, London, S.W.
 1879 Duncan, John, Tilney, St Lawrence, Kings Lynn
 1882 Duncan, Robert, Berwick Farm, Stamford River, Essex
 1871 Eden, Henley, Woodstock, Ascot, Berks
 1878 Edmondson, T., 144 Princes Street, Old Garralt, Manchester
 1878 Eley, Rev. Dr Wm. H., Etchingham Rectory, Hawkhurst—*Free Life Member*
 1875 ELLSWERE, The Right Hon. The Earl of, Worsley Hall, Manchester
 1873 Elliot, Prof. Thos. J., Hole Park, Rolvenden, Kent—*Free Life Member*
 1880 Ellis, O. W., 6 Grosvenor Place, Jesmond, Newcastle-on-Tyne
 1882 Ensor, Thos. H., 54 South Street, Dorchester—*Free Life Member*
 1882 Esson, Robert, 42 Duke Street, St James's, London, W.
 1886 Faber, Alfred D., Belmont, Ilfracombe—*Free Life Member*
 1869 Ferme, G., Leigham Lodge, Roupell Park, Streatham Hill, Surrey
 1891 Fleet, W. J., Estate Office, Thurlow, Suffolk—*Free Life Member*
 1876 Fleming, D. G., Favarham, Bedford
 1881 Fleming, Hugh, Felmersham, Bedford
 1891 Forbes, A. C., the Home Farm, Baward, Caine, Wilts—*Free Life Member*
 1866 Forbes, C. W., Sandecotes, Parkstone, Dorset
 1884 Friar, Thomas, of Grindon Ridge, Northam-on-Tweed
 1892 Gascoigne, Major K. F. T., Parlington, Aberford, Leeds
 1877 Gell, H. C. Fole, Hopton Hall, Wirksworth
 1879 Gibson, J. G., 1 Vanburgh Park, Blackheath, London
 1889 Gilchrist, D. A., University College of North Wales, Bangor—*Free Life Member*
 1882 Gilkes, Gilbert, Canal Iron Works, Kendal
 1873 Goddard, H. R., Fairfield, Illogan, Redruth—*Free Life Member*
 1875 Gordon, W. R. G., Barsham Lodge, Sandown, Isle of Wight
 1806 Gough, Wm., Land Agent, Wykeham
 1881 Gover, L. D., 83 Lambeth Palace Road, S.E.—*Free Life Member*
 1886 Gow, George, Tregothnan Office, Truro
 1869 Graham, George, Oakbank, Longtown
 1865 Graham, Paul, Brooks's Club, London
 1888 Graham, William, Eden Grove, Kirkbythore, Fenrith
 1862 Grant, Field-Marshal Sir Patrick, G.C.B., Chelsea Hospital
 1868 Gray, T. R., St Margaret's, Cheltenham
 1892 Griffen, Hugh Reid (W. A. Wood & Co.), 36 Worship Street, London
 1894 Gwynne, A. T. J., of Monachty, Cardigan
 1884 Hall, David, Ingram, Ailnwick
 1877 Hall, T. F., Billiter Buildings, Billiter Street, London, E.C.
 1883 Hamilton, H. W., Lilleshall, Newport, Salop—*Free Life Member*
 1888 Handley, John, Greenhead, Milnthorpe
 1887 Handley, William, Greenhead, Milnthorpe, Westmoreland

Admitted

- 1884 Hardy, C. W. L., Gittisham, Honiton—*Free Life Member*
 1867 Harris, Wm., 16 The Grove, Blackheath, London, S.E.
 1875 Haughton, W. H., Highlands, Gt. Burford, St Neots
 1887 Haviland, W. A., Warbleton, Heathfield, Sussex
 1883 Hayward, C. P., Beaumont Manor, Lincoln
 1878 Henderson, John, Estate Office, West Dean, Chichester—*Free Life Member*
 1854 Henderson, Thos., Hastings Cottage, Seaton Delaval, Newcastle-on-Tyne
 1881 Henderson, W., East Ellington, Hexham—*Free Life Member*
 1877 Herdman, George, The Abbey Farm, Massingham
 1883 Hetherington, R. B., Earl Street, Carlisle
 1878 Hill, A. J., 86 Lansdowne Road, London, W.—*Free Life Member*
 1873 Holliday, Jonathan, Kirkbampton, Carlisle
 1878 Holliday, Wm., Pelutho West House, Abbey Town, Carlisle
 1878 Holliday, Wm., Flumbland, Aspatria, Carlisle
 1875 Holm, John, Waterend, Ongar, Essex
 1886 Hooper, C. H., Highlands Farm, Swanley, Kent—*Free Life Member*
 1880 Hope, A., Cleveland Cottage, Middleton in Teesdale
 1878 Hope, John W., 3 Rumford Street, Liverpool
 1878 Hornsby, J., Spittalgate Ironworks, Grantham
 1868 Howie, H. B., North Hazelrigg, Belford
 1865 Hudspeth, Wm., Green Croft, Hailwhistle
 1872 Hughes, G. P., of Middleton Hall, Wooler
 1869 Hume, Archibald, 14 Imperial Square, Cheltenham
 1879 Hunt, A. E. Brooke, Holmsley, Slough, Bucks—*Free Life Member*
 1868 Hutton, Arthur, Lorton, Tottenhall, Cheshire
 1888 Inman, A. H., care of Glyn, Mills, Currie, & Co., 67 Lombard Street, London, E.C.—*Free Life Member*
 1891 Irving, Robert Jas., Blackhole House, Carlisle—*Free Life Member*
 1855 Jobson, W., Ashfield Villa, Heaton, Newcastle
 1873 Juckes, R. F., Harley, Much Wenlock—*Free Life Member*
 1876 Keith, Lieut.-Col. Jas., Capel Hall, Frimley, Ipswich
 1875 Kennedy, W., Lewes and County Club, Lewes—*Free Life Member*
 1883 Kenyon, J. W., Orly Woodhouse, Fartown, Huddersfield
 1874 Kidd, H., V.S., Market Place, Hungerford, Berks
 1880 Kidston, Jn. P., Nym Park, Barnet, Herts
 1862 Kilpatrick, P., 32 Old Kent Road, London
 1868 Lawes, Sir John B., Bart., Rothamstead, St Albans
 1878 Leggat, Alex., 248 Dixon Road, Wavertree, Liverpool
 1875 Lightfoot, H. Le Blanc, Corpus Christi College, Oxford
 1875 Linn, W., 2 Park Terrace, Newcastle-on-Tyne
 1891 Lister, Joseph, Little Broughton, Carlisle—*Free Life Member*
 1885 LONDONDERR, Most Noble The Marquis of, Seahamhall, Seaham Harbour

Admitted

- 1881 Lonsdale, Claud, Rose Hill, Carlisle
 1885 Lopes, Sir Massey, Bart., 28 Grosvenor Gardens, London
 1880 Lowndes, Major Jas., Junior United Service Club, London
 1884 Lyal, William, Myton Grange, Helperby, York
 1884 Macandrew, D. M., Kilrock, Asheldon Road, Torquay
 1878 M'Connell, P., Ongar Park Farm, Ongar—*Free Life Member*
 1878 M'Cracken, W., Crews—*Free Life Member*
 1886 M'Creath, H. G., Galagat House, Northam-on-Tweed
 1888 Macdonald, Alex., Proprietor, *Farmer and Stockbreeder*, 190 Fleet Street, London, E.C.
 1841 Macdonald, Major-Gen. Alistair M'Ian, 27A Park Lane, London, W.
 1891 Macdonald, Charles, Editor, *Farmer and Stockbreeder*, 190 Fleet St., London, E.C.
 1877 M'Fadyean, Prof. J., Royal Veterinary College, Camden Town, London
 1879 M'Gregor, Alex., Leigh, Lancashire
 1895 Macgregor, Thos., The Chestnuts, Brandenburgh Road, Sunnerbury, W.
 1882 Mackay, John, 31 Beresford Road, Birkenhead
 1875 Mackay, Thomas, Westwood, Coventry
 1874 M'Kerrow, A., Crotthead House, Aston Hope, Derbyshire
 1868 Mackintosh, Dr C. H., Morden Hall, Torquay
 1846 Mackintosh, G. G., Richmond House, Twickenham
 1880 M'Laron, John, Hunslet, Leeds
 1846 Macleay, Alex. D., Conservative Club, London, W.
 1865 M'Lennan, Donald, 42 Sackville Street, Piccadilly, London, W.
 1888 M'Leod, J. M., 224 Park Road, Crouch End, London, N.
 1886 M'Minnies, Henry H., Farington, Preston—*Free Life Member*
 1870 M'Monies, J., Chavening Estate Office, Sevenoaks, Kent
 1865 MACNAGHTEN, Sir Stewart, Bitterne Manor House, Southampton
 1870 M'Naughton, D., 79 Mark Lane, London, E.C.
 1875 Maddison, H., The Lindens, Darlington
 1870 Main, G. Agnew, Portland Square, Carlisle
 1884 Malcolm, John, M.R.C.V.S., Birmingham—*Free Life Member*
 1880 Mangin, W. Nangreave, Preston, Chathill
 1861 Mangles, Geo., Givendale, Ripon, Yorkshire
 1882 Mann, Robt. J., Home Farm, Acton Burnell, Shrewsbury
 1884 Marriott, T. E., Newnham House, Daventry
 1878 Marryat, George Selwyn, The Close, Salisbury
 1868 Marshall, James, Gainsborough
 1888 Massey, Fred. J., 54 Bunhill Row, London
 1884 MAXWELL, Hon. B. C., 1 Gloucester Pl., Portman Square, London, W.
 1879 Meade-Waldo, E. W., Barmoor Castle, Beal
 1891 Menzies, Robert, Haverland, Norwich
 1877 Millican, J., Wedholm House, Abbey Town
 1878 Mitchell, John, Toffhill, Dunchurch, Rugby
 1869 Moffat, James, White Lion, Brampton
 1852 Moncrieff, Col. Alex., C.B., F.R.S., 15 Vicarage Gate, Kensington, London, W.

Admitted

- 1861 MONTAGU of Beaulieu, Lord, Palace House, Beaulieu, Southampton
 1885 Moore, George, Longhirst, Morpeth
 1889 Moore, John C., Brook Farm, Cobham, Surrey
 1878 Moubray, J. M., Broom Court, Alcester
 1880 Moulst, John, Royal Buildings, Newcastle-on-Tyne
 1877 Mounsey, Wm. R. Lowther, Newton, Penrith
 1888 Muir, James, Yorkshire College, Leeds—*Free Life Member*
 1873 Munby, E. C., The Hermitage, Oswaldkirk—*Free Life Member*
 1867 Murray, G., Elvaston Castle, Derby
 1873 Murray, James, Junior Carlton Club, London
 1865 NEPMAN, Sir M. H., of Loders Court, Bart., Bridport
 1872 Newton, T. H. G., Barrels Park, Henley-in-Arden, Birmingham
 1878 Nicholson, W. N., Newark
 1882 Nickels, John Tetley, The Day House, Shrewsbury
 1892 Noel, Ernest, Lydhurst, Haywards Heath, Sussex
 1879 North, G. F., Wroxton Estate Office, Banbury
 1858 Ogilvie, Wm. R., Skelton, Penrith
 1874 Ogilvy, John E., 21 The Grove, South Kensington, London
 1872 Oliphant, L. J., Guards' Club, London
 1875 Ord, J. R., Houghton Hall, Darlington
 1867 Paterson, C., Canford Manor, Wimborne
 1857 Paton, A., Norwood, Sydenham, London
 1864 Pelham, C. T., Cound Rectory, Shrewsbury
 1869 Pender, John, 66 Old Broad Street, London
 1888 Perkins, W. F., M.R.A.C., Portwood House, Southampton—*Free Life Member*
 1880 Pilkington, Claude M., Wollaton, Nottingham
 1885 Pollock, Tho., Estate Office, Bodnant, Eglwysbach, R.S.O., Denbighshire
 1885 Prentice, Manning, Chemical Works, Stowmarket
 1875 Preston, W. Conway, Stream, Farnham, Surrey
 1883 Quibell, W. O., Highfield House, Newark
 1892 Rand, John, South Benington, Beal
 1878 Ransome, James Edward, Ipswich
 1870 Rawlins, J. D., Rose Farm, Formby, Liverpool
 1878 Reay, Thomas, Abbey Town, Carlisle
 1857 Redfern, W. Macquarrie, Conservative Club, St James Street, London
 1877 Rennie, John, Askham, Retford
 1878 Richardson, J., London Road, Carlisle
 1878 Richardson, R. A., 128 Shiel Road, Newsham Park, Liverpool
 1888 Richmond, Jas. G., Globe Works, South-hall Street, Manchester
 1880 Riddle, Andrew, Yeavinger, Wooler
 1852 Rintoul, Chas., Strawberry Hall, Buxted, Sussex
 1886 Robertson, Charles T. A., Little Horringer Hall, Bury St Edmunds—*Free Life Member*, 1888
 1876 Robertson, George, Athenæum Club, Pall Mall, London
 1861 Robertson, S. E., L. & N.-Western Railway, Broad Street, London
 1878 Robinson, Thos., Cargo, Carlisle
 1884 Robson, Jacob, Byrness, Otterburn
 1881 Rodger, Geo., Newton Bank, Preston Brook
 1888 Rodger, R., Hadlow Castle, Tunbridge

Admitted

- 1873 Rome, Thos., Charlton House, Charlton Kings—*Free Life Member*
 1879 Roscoe, Wm. C., Broughall House, Whitchurch, Shropshire
 1880 Ross, D. A. M., 62 Lombard Street, London, E.C.
 1870 Ross, J., The Grove, Ravenglass, Carnforth
 1890 Rudd, Ash, East Ruston Hall, Stalham, Norwich—*Free Life Member*
 1870 Ryrie, R., 84 Park St., Grosvenor Sq., London
 1855 SANDILANDS, Hon. James, 31 Princes' Gate, London
 1872 Selby, B. F., Paston, Coldstream
 1890 Sessions, Harold, Russell House, Gloucester—*Free Life Member*
 1873 SINCLAIR, The Right Hon. Lord, 55 Onslow Square, London, S.W.
 1854 Smith, Wm., Melkington, Cornhill
 1892 Solomon, F. O., North-Eastern County School, Barnard Castle—*Free Life Member*
 1891 Spence, Arthur George, 3 St Aidan's Terrace, Birkenhead
 1887 Stanhope, John Montague Spencer, Cannon Hall, Barnsley, Yorkshire
 1869 Statter, T. jun., Stand Hall, Whitefield, Manchester
 1884 Stephan, H. C., Avenue House, Finchley, London
 1890 Stephenson, C., V.S., Sandyford Villa, Newcastle
 1863 Stewart, J. A. Shaw, 71 Eaton Place, London
 1863 Stewart, Neil P., Vaynol, Bangor, North Wales
 1877 Stirling, A., 30 Eccleston Street, London, S.W.
 1884 Sturdy, Norman, Thurstonfield Tannery, Carlisle
 1866 Swanwick, R., R.A.C. Farm, Cirencester
 1888 Thompson, Henry, V.S., Aspatria
 1867 Thompson, H., of High Green, Ramshope, Otterburn
 1883 Tiffen, J. H., 4 Grosvenor Terrace, Hull—*Free Life Member*
 1869 Tinning, J., Lowther Street, Carlisle
 1869 Toppin, John C., Musgrave Hall, Skelton, Penrith

Admitted

- 1801 Townley-Parker, T. Townley, Cnordon Hall, Bamber Bridge, Preston
 1866 Trotter, T. C., 54 Park Street, Grosvenor Square, London, W.
 1859 Turner, Frederick J., Mansfield, Woodhouse, Mansfield, Notts
 1880 Turner, Thos. Warner, Welbeck, Worksop, Notts
 1878 Twentyman, J. M., Hawkrigg House, Wigton, Cumberland
 1877 Unite, Jn., 291 Edgeware Rd., London, W.
 1877 VANE, Sir H. R., of Hutton in the Forest, Bart., Penrith
 1872 Walker, J. P. S., Lattlegaie, Oxford
 1878 Wall, Geo. Y., Durham—*Free Life Member*
 1873 Walton, G. K., Long Campton, Shipston-on-Stour—*Free Life Member*
 1883 Wardman, Robert, Warwick Bank House, Carlisle
 1868 Watt, James, Knowfield, Carlisle
 1856 Webb, Major W. G., of Woodfield, Wordsley, Stourbridge
 1881 Weber, F. H., 41 High Street, Guildford—*Free Life Member*
 1860 Welsh, John, Rudfen Manor, Kenilworth
 1863 WHARNCLIFFE, Right Hon. Lord, 15 Curzon Street, London
 1891 White, W. E. O., Elsham Brigg, Lincolnshire—*Free Life Member*
 1888 Wilkie, Thomas, Forester to the London County Council, 21 Belleville Road, Wandsworth, London, S.W.
 1854 Willis, T., Manor House, Carperby, Bedale
 1869 Wilson, Sir Jacob, Chillingham Barns, Alnwick—*Free Life Member*, 1873
 1892 Wilson, Jas., jun., University College of Wales, Aberystwyth—*Free Life Member*
 1892 Wilson, Wilham, Goodyhills, Maryport—*Free Life Member*
 1873 Wilson, William, Leigh, Lancashire
 1878 Wilson, Wilham, Low Barmiston, Washington Station, Durham
 1881 Woodroffe, D., Chace View, Rugeley
 1876 Wordsworth, R. W., Whitemoor House, Ollerton, Notts
 1879 Young, R. W., Billeswell Manor, Litterworth
 1878 Young, Wm., Burrsgreen, Sacombe, Ware, Herts
 1877 ZETLAND, Earl of, Aske, Richmond, Yorkshire

IRELAND.

- 1869 Brodie, Jas. W., Cloheen, Buttevant, Co. Cork
 1873 Campbell, Geo., Kilkea, Mageny, Co. Kildare—*Free Life Member*
 1877 Fennessy, Thos., Grange Villa, Waterford
 1888 Fox, Richard M., of Foxhall, Rathowen
 1876 Gilchrist, And., Grovedale, Golden Ball, Co. Dublin
 1884 Goulding, W. J., Rosbuck Hill, Bootstown

- 1892 Kennedy, Samuel, Elmgrove, Belfast
 1876 Maconchy, J. A., Kildare Street Club, Dublin—*Free Life Member*
 1870 Paterson, Alex., Townakeady, Ballinrobe, Mayo
 1869 Purefoy, Edward B., Greenfields, Tipperary—*Free Life Member*
 1883 Robertson, Thomas, Great Northern Railway, Amiens Street, Dublin

FOREIGN COUNTRIES.

- Admitted
 1880 Aalvik, E. A., Ostonso, Hardanger, Norway
 1882 Alexander, A. S., 216 Clark St., Chicago—*Free Life Member*
 1876 Anderson, R. Lang, Manager, The Aboukir Company, Limited, Ramleh, Egypt—*Free Life Member*
 1864 Arbuthnott, Hon. Mrs., Norway
 1881 Auld, R. C., 1407 Michigan Avenue, Chicago, U.S.A.
 1868 Baird, Arthur E., Brussels
 1887 Banerjee, N. N., Calcutta—*Free Life Member*
 1888 Basu, G. C., 196 Bowbazar St., Calcutta—*Free Life Member*
 1876 Bean, William, Rosebank, Winnipeg, Manitoba
 1881 Blyth, A. H., Frankfield, Manitoba
 1842 Booth, James G., Seed Merchant, Hamburg
 1851 Bogie, John, Auckland, New Zealand
 1878 Bramwell, John, River Plate Trust Loan and Agency Co., Calle San Martin 56, Buenos Ayres—*Free Life Member*
 1876 Brown, J. H., Wairoa, New Zealand
 1871 Bruce, George C., Staunton, Virginia, U.S.A.
 1879 Brydome, W. S., Dunedin, New Zealand
 1874 Burn, Forbes, care of The National Agricultural Society of Victoria, Bourke Street, Melbourne—*Free Life Member*
 1879 Cantlie, Charles A., Natal
 1850 Christie, A., Glencairn, Dipton, Scotland, New Zealand
 1864 Cotesworth, Robert, Cannes, France
 1868 Craig, R. (Francis Lowe & Co.), Chapelton, Jamaica
 1875 Crerar, Donald, Estancia San Alonzo, Estaciones Batio, F.C. Ensenada, Buenos Ayres
 1888 Croil, Thos., North Western Sledge Co., Milwaukee, Wisconsin, U.S.A.
 1872 Currie, James J., Blinkbonny, Birtle, Manitoba
 1877 Currer, Adam Henry, Studio, Sherman Block, St Paul's, Minnesota, U.S.A.
 1874 Dahl, Ferdinand August, Director of the Royal Higher Agricultural School at Aas, Christiania—*Honorary Associate*
 1870 Donaldson, Alexander, 54 Avenue Wagram, Paris
 1888 Driberg, Christopher, Colombo, Ceylon—*Free Life Member*
 1855 French, J., Sortikjoer, Fredrickshaven, Denmark
 1878 Giglioli, Italo, Professor of Agricultural Chemistry, Portici—*Free Life Member*
 1870 Gordon, R. W., British Columbia (c/o John Gibson, Howford, Peables)
 1855 Graham, H., Auckland, New Zealand
 1827 Graham, James, Toronto, Canada
 1867 Hallen, J. H. B., M.R.C.V.S., Inspecting Veterinary Surgeon, Bombay
 1868 Hardie, William H., Gamboola, Casterton, Victoria, Australia
 1884 Harris, Richard H., Papatollor, Auckland, New Zealand
 1871 Heggie, Henry, Roseburg, Douglas Co., Oregon, U.S.
 1880 Hoggan, Andrew, jun., Queensland
 1880 Holmes, The Hon. Matthew, Cintra, Dunedin, New Zealand
- Admitted
 1890 Kerr, James, Schatz Station, Ramleh, Egypt—*Free Life Member*
 1864 King, David, Dunedin, New Zealand
 1875 Leithhead, James, Mokoia, Woodville, Hawkes Bay, New Zealand
 1885 Lowrie, William, Prof. of Agriculture, Roseworthy, South Australia—*Free Life Member*
 1885 Macdonald, A. C., Department of Agriculture, Grahamstown, Cape of Good Hope—*Free Life Member*
 1871 M'Dougall, J. W., 48 Wellington Place, Toronto, Ontario, Canada
 1888 Macpherson, John, Sorrento, San Diego Co., California, U.S.A.
 1860 Mein, N. A., Hotel de Emperoure, Boulevard, Dunbanchago, Nice
 1889 Middleton, T. H., Baroda College, Baroda, India—*Free Life Member*
 1859 Mills, G., Glenmona Park, Bung Bong, Victoria
 1861 Mitchell, David, Dalton, Ottertail County, Minnesota, U.S.
 1883 Mollison, James, jun., Fort-MacLeod, Alberta, N.W.T.
 1886 Moos, N. A. F., Bombay, Poona—*Free Life Member*
 1861 Morison, James, Topeka, Kansas
 1886 Mukerji, N. G., Bhowanipur, Calcutta—*Free Life Member*
 1888 Mutter, Major J. M., Somenos Ranch, Somenos, E. and N. Reg., Victoria, B.C., Canada
 1878 Nonnen, J. B., Norway—*Free Life Member*
 1875 Pringle, A. T., 42 Market Street, Sydney, N.S.W.
 1877 Pudney, R. L., Dookie Farm School, Cashel, Victoria, Australia—*Free Life Member*
 1878 Robertson, J., of Golden Grove, Adelaide, South Australia
 1859 Robertson, W. M., 32 Bedford Street, Port Hope, Canada
 1880 Scott, Charles, South Africa, care of John Scott, 4 Elliot Street, Glasgow
 1892 Scheult, Louis C., Santa Rosa, Arima, Trinidad—*Free Life Member*
 1866 Shiels, George, Monett, Mo., U.S.A.
 1887 Steele, Daniel, Agricultural Manager, Lake Copais Company, Ltd., Athens Agency, Athens, Greece—*Free Life Member*
 1873 Turner, Peter, Balsam Grove, Drumquin, Ontario, Canada
 1869 Tweeddale, George W., Ivy Hill, Westminster, Nelson County, Virginia, U.S.
 1871 Tweedie, Richard, The Forest, Clydesdale Stud Farm, Douglas, Kansas
 1867 Walker, J., Grassmere, Stonewall, Winnipeg, Manitoba
 1862 Walker, John, Vergelegen, Rosebank, Cape Town
 1874 Walker, R. B., Queensland
 1882 Wallace, R. Hedger, Professor of Agriculture to the Government of Victoria, Melbourne
 1852 Watson, William, Beecher Wills, Illinois, U.S.
 1865 Whyte, James, Waimea Road, Nelson, New Zealand
 1879 Wilson, John, jun., Gilbrea, Oakville, County Halton, Ontario—*Free Life Member*
 185 Wotherspoon, Archibald, West Oxford, Canterbury, New Zealand

MEMBERS WHOSE RESIDENCES ARE UNKNOWN.

[Members knowing the present Address of the following Gentlemen, or being aware of their Death, will please communicate with the Secretary, 3 George IV. Bridge, Edinburgh.]

Admitted	Admitted
1851 Aitchison, James (late Proney Mains, Dornoch), Anstralia	1876 Christie, James M., late Sunnyside, Prestonkirk
1870 Aitchison, Peter (late West Garleton, Haddington), America	1857 Clark, John, late Flender, Busby
1869 Aitken, Robert, late Kilmany, Cupar-Fife	1872 Clark, John Moir, late Kinchyle, Fitzjohns Avenue, London
1879 Anderson, John, late Castlehill, Blairgowrie	1869 Clark, Matthew, late Croftengea, Alexandria
1870 Anderson, John S., late Dalhousie Mains, Dalkeith	1871 Clark, William, late Stronchreggan, Fort-William
1845 Askew, Henry William, late Conishead, Priory, Ulverston	1873 Coningham, W. J. C., late High Street, Haddington
1851 Austin, R. S., late Middleton, Muthill	1864 Cousland, Jas. (late Banker, Deuny), Glasgow
1865 Baillie, John B., late of Leys, Inverness	1881 Cowan, Walter, late Blairhoyle, Stirling
1883 Bertram, Hugh, late Edinburgh	1852 Cowie, James, late The Elms, Dulwich Common, London, S.E.
1859 Beveridge, David, late Dunfermline	1875 Craig, H. V. Gibson, late Deans Court, Wimbome
1873 Bisset, Hugh, late Pitarrow, Laurence-kirk	1870 Craig, Robert, late Airdrie, Kirkbean, Dumfries
1851 Black, Jas. (late Factor, Ellon), London	1867 Craig, Robert, late Tarbert, Lochfyne
1870 Blacklaw, Alex. Scott (late Milton of Arbuthnot, Fordoun), Brazil	1875 Craig, William, late Old Meldrum
1873 Bland, Thos., late Greystone, Tullynessie	1868 Craik, Charles (late Esbie, Lochmaben), Australia
1836 Blane, Colonel Robert, C.B.	1869 Curror, John F., late Damhead, Murrayfield
1888 Boden, W. F., late Kinsteary Lodge, Nairn	1872 Curror, Peter (late Coxithill, Stirling), New Zealand
1883 Bonallo, W. C., late Clandaboyle, Co. Down	1860 Dalziel, Alex., late Glenwharrie, Sanquhar
1858 Borthwick, W. H., late Government House, Blairgowrie	1875 Dangerfield, Edward (late Balboughty, Perth), U.S.A.
1878 Brodie, William, late of Bush, Barkerland, Dumfries	1860 Davidson, Geo., late Walton, Linlithgow
1852 Brown, Andrew, M.D., late Edinburgh	1878 Dayton, Robert, late Lochearnhead
1861 Brown, James, late St Andrews	1884 Dick, John F., late Killelan House, Campbeltown
1872 Brown, J., late Murrays, Ormiston, Tranent	1883 Dowall, J. P., late Kelly Bleachfield, Arbroath
1875 Brownlee, T., late New Club, Glasgow	1867 Downie, William, late Kinbroom, Rothiemorinan
1874 Bruce, A. H. T., late of Falkland, Ladybank	1857 Drife, James (late Barr, Sanquhar), New Zealand
1875 Bruce, William L., late Glenkil, Lam-lash	1864 Drummond, John, of Belquhandy, late Gullton Rectory, Wingham, Kent
1870 Bryau, F. G. D., late 73 Bath Street, Glasgow	1874 Duff, Thomas, late Manor House, Sidmouth, Devonshire
1877 Bryce, W. C., late 27 Berkeley Terrace, Glasgow	1868 Duncan, James (late Killichonan, Ran-noch), New Zealand
1864 Brydon, H., late Knocknarling, New Galloway	1887 Dundas, D., Advocate, late 46 Heriot Row, Edinburgh
1875 Buchanan, Wm. (late Glasgow), America	1880 Dundas, T. G., late of Carron Hall, Larbert
1844 Cadell, Lieut.-General, late Upper Nor-wood, London	1857 Dunlop, Alexander, Glasgow
1882 Cameron, Donald, late Mossfield, Oban	1882 Dyson, Thos. C., late of Willowfield, Halifax
1869 Cameron, William, late Factor, Kingussie	1858 Edmonds, Leonard, London
1874 Campbell, John, late 88 West Regent St., Glasgow	1859 Edwards, Matthew, late Hilton, Alloa
1863 Campbell, T. H., late Guernsey	1884 Elliot, Robert, late Burnmouth, New-castleton
1856 Campbell, T. W., late of Walton Park, Dalbeattie	1882 Ewing, A. E. Orr, late Cardross House, Stirling
1878 Campbell, Wm., late Carterton, Lockerbie	1848 Farquharson, Major-General Francis
1856 Carnegie, Hon. Charles, late St Andrews	1870 Fernie, Chas., late Blackhall, Tulliallan
1850 Carnegie, John, Glasgow	1870 Fisher, John, late Knells, Carlisle
1880 Chaplin, G. Robertson, late of Murling-den, Brechin	1854 Fleming, James (late Three Mile Town, Linlithgow), Glasgow
1880 Chaplin, Captain T. R., late Lawhead House, Garwath	1865 Fleming, John (late London), Bombay
1881 Chirnside, John, late 48 Albany Street, Edinburgh	1848 Fletcher, Major C. E., late of Corsick
1874 Chisholm, John, late East Kirkland, Wigtown	
1850 Christie, Charles J., late Westbank, Tranent	

Admitted

1870 Forbes, C. W. L., late Aberfeldy
 1830 Forbes, George, Merchant, London
 1852 Forman, Robert, late Keith House, Upper Keith
 1840 Fox, Michael, jun., late Glencorse Mains, Penicuik
 1873 Fraser, H. N., late Tembain, Grey Town, King William Town, Cape Colony
 1840 Frazer, John (late Cromarty House), London
 1856 Frazer, Hugh, late 20 Arundell Gardens, London
 1859 Gamgee, John, late 1 Great Winchester Street Buildings, London
 1875 Gibson, Francis, late Oatfield, Drem
 1871 Gibson, J., late 34 Abbotsford Place, Glasgow
 1875 Gilchrist, Wm., late Knivocklaw, Loudoun
 1842 Giles, James, late of Kailzie
 1840 Gillespie, James, late Craigie, Cramond Bridge
 1875 Gillespie, Jas. John (late Parkhall, Douglas), New Zealand
 1873 Glen, James, late Holensburgh
 1847 Glen, John, late Merchant, Edinburgh
 1873 Glendinning, G. P., late Dalmeny Park
 1875 Gordon, A. Hay, late of Mayen, Huntly
 1860 Gordon, Christ., late Cannerie, Parton
 1870 Gordon, John (late Culraven, Kirkcudbright), America
 1868 Gordon, Thomas Dempster, late of Balmaghie, Castle-Douglas
 1868 Graham, Jas., late of Southbar, Paisley
 1873 Graham, Robt. G., late Burnfoot-on-Esk, Longtown
 1809 Greig, P. M., late 66 Inverleith Row, Edinburgh
 1884 Grier, W. F., late 55 Bath St., Glasgow
 1873 Grieve, Gilbert, late Cardiff
 1875 Haig, Wm. (late North St., St Andrews), Australia
 1871 Hain, Thomas, late Glasgow
 1865 Halliday, Thos., late Rosehall Foundry, Haddington
 1861 Hamilton, Daniel, late 66 Hutchison Street, Glasgow
 1855 Hamilton, J. B. (late Burnhouse, Carnwath), London
 1878 Hannay, Robert, late Bournemouth
 1871 Hardie, Charles, late Primrose, Dunfermline
 1851 Hartie, G. (late Orwell, Kinross), Australia
 1876 Harper, F. V., late Bridgend, Linlithgow
 1840 Harrop, Isaac Worthington, New Zealand
 1841 Hay, Gen. W., late of Whiterigg, Melrose
 1872 Hazle, Alex., late of Blackeraig, New Cumnock
 1847 Henderson, C. J., late Briery Yards, Hawick
 1857 Hood, James (late New Mains, Prestonkirk), Australia
 1871 Horn, John, late of Thomanean, Milnathort
 1864 Horncastle, Henry, late Whitemoor, Ollerton, Newark
 1864 Howden, John, late Nether Braco, Braco
 1853 Hubbach, Joseph, Liverpool
 1871 Hume, Geo. T., late Sunlawhill, Kelso
 1861 Hunter, Herbert, late Burnhead, Lock-
 erbie
 1888 Hutchinson, Alan, late Camserney Cot-
 tage, Aberfeldy
 1865 Inglis, Peter, late East Pilton, Ferry
 Road
 1863 Jack, Michael, late Peggy's Mill, Cramond
 1870 Jackson, John, late Bush, Ewos, Lang-
 holm

Admitted

1878 Jardine, A. M., late Kilnwick Hall, Cranswick, Hull
 1878 Kennedy, John B. (late Stenhouse, Thornhill), New Zealand
 1842 Kennedy, Wm., Commission Agent, Glasgow
 1863 Ker, B. Martin (late of Gateshaw, Moore-
 battle, Kelso), London
 1845 Kerr, Wm. Williamson, late Oriel College, Oxford
 1850 King, Jas. F., late 5 Richmond Street, Glasgow
 1883 Laidlay, R. W., late Halls, Dunbar
 1854 L'Amey, J. R., late of Dunkenny
 1854 Lang, William, late Brooks Horne, Card-
 ross
 1843 Lawson, Alex., Merchant, Dundee
 1868 Lawson, George Stoddart, late Edinburgh
 1859 Lawson, H. Graham, late Edinburgh
 1867 Lawson, Thomas, late Sandyford, Kirrie-
 mur
 1878 Lee, A. H., late of Blairhoyle, Port of
 Monteith
 1855 Lees, John, late Marvingston, Hadding-
 ton
 1857 Lindsay, James (late Kilchinbuach, Campbeltown), New Zealand
 1884 Lindsay, James (late Wester Haprew, Stobo), Australia
 1863 Livingstone, T. L. F., late of West
 Quarter, Falkirk
 1865 Lorimer, J., late Achrossan, Tigh-na-
 bruaich
 1850 Lumsden, G., late Leslie Lodge, Inver-
 urie
 1883 Lumsden, T. W. M., late Balharg, Meigle
 1850 Lyall, Robert, late Rosefield Place, Portobello
 1870 McAdam, J. N., late High Trees, Marl-
 borough
 1840 Macalister, Alexander, of Loup and Tor-
 risdale
 1840 Macarthur, Major Alexander
 1842 Macarthur, Duncan (late Dunollybeg),
 New Zealand
 1853 M'Ansian, J., late Kilbrideg, Cairn-
 dow
 1871 M'Bean, John (late Factor's Office, Grantown), New Zealand
 1857 M'Chlery, Henry, London
 1884 M'Cowan, George, late Glenmanno, Pen-
 pont, Thornhill
 1869 M'Culloch, R. C., late 7 Broughton Pl.,
 Edinburgh
 1838 M'Donald, Dr. Alex., Prince Edward's
 Island
 1839 Macdonald, Roderick C., late Paymaster,
 80th Regiment
 1860 Macdonald, W. S., late The Priory, New-
 haven Road
 1871 M'Dougall, John W., late of Orchill,
 Blackford
 1834 M'Ewan, J., late Tar of Ruskie, Callan-
 der
 1872 Macfarlane, John, late 19 Ann Street,
 Hillhead, Glasgow
 1857 M'Isaac, John, late Dumglass, Campbel-
 town
 1889 M'Kean, John, late Ballewan, Strath-
 blane
 1844 Mackenzie, Daniel, jun., Merchant, Glas-
 gow
 1868 MACKENZIE, Sir Jas. D., of Scatwell,
 Bart., late Dingwall
 1879 Mackenzie, Murdo (late Banker, Tain),
 America
 1860 M'Knight, Alexander (late of Barlochan,
 Dalbeattie), London
 1849 MacLaine, George, late 6 Albert Drive,
 Glasgow

Admitted

- 1859 M'Laren, Joseph (late Greenhead of Arnott, Kinross), Australia
 1874 Macleod, D. D. M'L., late Nairn
 1871 M'Lellan, David, late of Marks, Kirkcudbright
 1873 MacNab, John, late Bracklin, Callander
 1857 M'Phail, Alex. (late Drumgare, Campbelltown), America
 1860 Macpherson, John (late Killihuntly, Kingussie), Ontario, Canada
 1850 Macrae, Don., late 155 Hill St., Garnethill, Glasgow
 1857 M'Tavish, Duncan (late Dalmore, Campbelltown), America
 1848 Maclier, Alex. Walker, late of Durris, Aberdeen
 1876 M'William, Mrs, late Aberdeen
 1864 Marr, J. A., late of Alderston, Mid-Caldor
 1874 Martin, J., late Beechwood Mains, Corstorphine
 1858 Martin, John, late Hamilton
 1854 Meikle, David, late Inch House, Grangemouth
 1885 Menzies, John G., late 6 Grosvenor Crescent, Edinburgh
 1873 Michael, James, late Dunmore, Stirling
 1843 Miller, Captain Alex. Penrose, late 92d Highlanders
 1873 Miller, C. W., late Wellwood, Bridge of Allan
 1843 Miller, O. G., late of Pittendreich, Dundee
 1859 Milne, James (late Meinfoot, Ecclefechan), America
 1874 Mitchell, Wm., late North Ossemsley, Lymington
 1871 Moir, James, late Banker, Alloa
 1873 Mollison, James, late Pavenham, Bedford
 1850 Morison, James G., Glasgow
 1843 Moubray, John Marshall, late of Hartwood
 1832 Muir, John G., late Anderston Foundry, Glasgow
 1862 Muirhead, E. W., late The Hill, Putney, Surrey
 1863 Muirhead, George (late Durdle, Errol), London
 1878 Mundell, Walter, late Gollanfield, Fort-George Station
 1854 Murray, George (late Mount Pleasant, Berwick), New Zealand
 1857 Napier, Dugald (late Fort-Dundas, Glasgow), Australia
 1844 Nicoll, Alexander, late York Place, Edinburgh
 1860 Norman, Wm., late Hall Bank, Aspatia—Free Life Member, 1873
 1870 Patterson, Alex., late Lawhill, Auchterarder
 1855 Paul, William, late Advocate, Aberdeen
 1884 Pitcairn, D. D., late Blackhouse, Reston
 1878 Pitcairn, Henry H., late Tiroran, Mull
 1831 Powrie, Archd., late Lairwell, Perth
 1863 Primrose, James Thomson, late Sauchland, Ford
 1852 Pringle, R. K., late Shorncliffe, Cheltenham
 1870 Ralston, A. R., late Straiton, Maybole
 1867 Ralston, Andrew W. (late Lagg, Ayr), America
 1837 Ranken, George (late Drumley, Ayrshire), Australia
 1868 Rate, George (late Mungoswells, Drem), America
 1870 Rawlins, J. D., late Rose Farm, Formby, Liverpool
 1844 Reid, Charles G., W.S.

Admitted

- 1873 Richardson, Alex., late Castleton, Gorebridge
 1861 Richmond, G., late Balhaldie, Braco
 1831 Rickman, Thomas, late Architect, Birmingham
 1865 Ritchie, Charles, late Ladoga Lodge, Musselburgh
 1856 Robertson, J., late 68 Bath Street, Glasgow
 1870 Robertson, James A. (late Chapel Park, Kingussie), Virginia, U.S.
 1836 Robertson, James, late 27 Albert Place, Stirling
 1870 Robertson, Peter D., late 9 King Street, London
 1871 Roy, Fred. L., late of Nenthorn, Kelso
 1856 Royd, Robert Whyt, late Balbeggie, Kirkcaldy
 1802 Russell, John, late Saughtonhall Mains, Edinburgh
 1853 Russell, Sir Wm., of Charlton, Bart.
 1870 Saunders, R. B., late Hutton Grange, Gisburgh
 1875 Scobie, N. F., late of Hawkhill, Inverness
 1804 Scott, Lord Charles, late Eldon Hall, St Boswells
 1841 Scott, Captain Robert, late H.E.I.C.S.
 1859 Seton, Henry, U.S., late Tollycross, Edinburgh
 1863 SHAND, Right Hon. Lord
 1804 Shand, William (late Crichton, Ford), New York
 1831 Sharp, James, late Viewfield, Blackford
 1834 Shillinglaw, Wm., late Haymount, Duns
 1873 Sievwright, William (late Solicitor, Lerwick), New Zealand
 1830 Simpson, Alex. Horatio, late Hayes, Uxbridge
 1879 Simpson, Alexander, late Inverness
 1868 Simpson, George (late Burreldales, Banff), America
 1869 Simpson, George, late 2 Lauder Road, Edinburgh
 1871 Simson, Thomas, late Skelpie, Cupar
 1859 Sinclair, Archibald, late Minard, Inveraray
 1823 Skinner, Captain C. G. Macgregor, late Carisbrooke House, Isle of Wight
 1863 Slipper, Robert B., late 427 New Cross Road, London
 1858 Smart, John, late Glasgowsago, Blackburn, Aberdeen
 1886 Smith, Andrew, late Whitesfield, Coupar-Angus
 1872 Smith, George P., late 3 Viewforth Ter., Edinburgh
 1873 Smith, William B., late 32 Ashchurch Grove, London—Free Life Member
 1850 Somerville, Wm., late Merchant, Glasgow
 1860 Spence, A. W., late Glencairn House, Crieff
 1862 Steedman, John, late Charlestown, Dunfermline
 1854 Stegmann, Conrad, late Merchant, Leith
 1855 Steuart, Robt., late Dundale, Gravesend
 1833 Steuart, William (late of Glenormiston), London
 1853 Stevenson, John B. (late Westfield, Queensferry), New Zealand
 1860 Stevenson, Robert, late Banker, Edinburgh
 1870 Stewart, D., late Unthank, Langholm
 1842 Stewart, David, London
 1857 Stewart, William, late 24 Maclean Street, Glasgow
 1864 Stirling, Captain Gilbert, late Royal Horse Guards
 1837 Stirling, James, late Tamano, Braco
 1865 Sutherland, E. C., late of Skibo, Dornoch

Admitted

1849 Sutherland, George, late of Forss, Wick
 1852 Sutherland, N., late Springvale, Sheffield
 1885 Syne, David F., C.A., late 31 St Andrew
 Square, Edinburgh
 1848 Symington, Thomas, late Eastside, Pen-
 cuik
 1872 Thomas, William, late Pinnacle, Ancrum,
 Jedburgh
 1873 Thomson, A., late Morton Mains, Lothian-
 burn
 1860 Thomson, Duncan M. (late Stirling),
 Chicago
 1875 Thomson, Thomas, late Bankhead, Alloa
 1850 Thomson, Thomas, Merchant, Glasgow
 1844 Timins, William, late of Hillfield, Stan-
 more, Middlessex
 1850 Tod, Alex., late Aikendeane, Lasswade
 1884 Todd, John, late Tinwald Shaws, Dum-
 fries
 1878 Turnbull, D., late Brieryards, Hawick
 1877 Underwood, Peter, late Mains of Essich,
 Inverness
 1860 Vassal, Lieut.-Gen. B., late 9 Westbourne
 Street, Hyde Park, London
 1856 Vere, C. E. Hope, late Ledard, Aberfoyle
 1888 Vincent, E. H., late Lauder Barns,
 Lauder
 1874 Waddell, George, late 8 Pentland Ter-
 race, Edinburgh
 1857 Wakefield, J. Collen, late Eastwood,
 Thornliebank
 1847 Walker, Charles (late Drumblair), Aus-
 tralia

Admitted

1857 Walker, John, late Eastfield, Springburn
 1861 Walker, Robert (late Muirhall, Perth),
 San Francisco
 1861 Wallace, John, late Illieston, Broxburn
 1871 Wallace, William, late Newton of Col-
 lessie
 1855 Watson, Crawford, late The Lone, Ten-
 bury, Worcestershire
 1850 Watson, Douglas (late Thurstar, Wick),
 New Zealand
 1870 Watson, George, late Fushiebrae, Gore-
 bridge
 1872 Watson, Patrick, late Friarstown House,
 Tullaught, Dublin
 1884 Watson, W. H., late Ruthven, Cold-
 stream
 1878 Williamson, James, late Greenhead,
 Wishaw
 1872 Wilson, George, late Greenhill, Selkirk
 1860 Wilson, James, late Barmersyde West, St
 Boswells
 1844 Wilson, James, late Virginia Street,
 Glasgow
 1870 Wilson, F., late 3 Alfred Pl., Canonmills
 1857 Wilson, Thomas, late Auchincorrie,
 Campbeltown
 1883 Winton, Alex., late Viewhill, Ardersier
 1858 Wood, James, late Crown Street, Aber-
 deen
 1878 Wyatt, S., late Nydie Mains, St An-
 drews
 1855 Wyllie, W. A., late 14 West-End Park
 Street, Glasgow

TOTAL NUMBER OF MEMBERS, 4985.

HONORARY MEMBERS.

HONORARY ASSOCIATES.

1874 Dahl, Ferdinand August, Aas, Chris-
 tiania

1874 Holst, Christian, Norwegian Court Pay-
 master

LIST OF DIPLOMA HOLDERS, FREE LIFE MEMBERS.

By a By-law passed in 1873, with reference to the Supplementary Charter of 1866, successful Candidates for the Society's Agricultural Diploma are thereby eligible to be elected Free Life Members of the Society.

In 1882, the holders of the Diploma memorialised the Council, pointing out the want of some distinctive title attached to the Diploma, and praying that the title F.H.A.S. (Fellow of the Highland and Agricultural Society of Scotland) be granted to them. The Council acceded to the prayer of the Memorial.

Admitted

- 1870 Aitken, John M., Norwood, Lockerbie
1882 Alexander, A. S., 216 Clerk St., Chicago
1876 Anderson, R. Lang, Manager, The
Aboukir Co., Limited, Ramleh, Egypt
1873 Ashdown, A. H., M.R.A.C., Castle House,
Shrewsbury
1887 Banerjee, N. N., Calcutta
1888 Bardgett, John, 1 Gayfield Street, Edin-
burgh
1883 Basu, Giris Chandra, 196 Bowbazar St.,
Calcutta
1884 Benson, R. A., Duchy of Cornwall
Office, Liskeard, Cornwall
1885 Birch, Walter de Hoghton, Kerry, Mont-
gomeryshire
1878 Bramwell, John, River Plate Trust Loan
and Agency Co., Calle San Martin 56,
Buenos Ayres
1891 Brown, John, Hillhead Farm, Airdrie
1873 Brown, William, Earlsmill, Forres
1873 Browne, Colville, M.R.A.C., 26 Mill St.,
Bedford
1873 Brydon, Robert, The Dene, Seaham Har-
bour
1874 Burn, Forbes, care of The National
Agricultural Society of Victoria,
Bourke Street, Melbourne
1882 Buttar, Thos. A., Corston, Coupar-Angus
1873 Campbell, George, Kilken, Mageny, Co.
Kildare
1892 Campbell, John, Glenghside, Lockerbie
1885 Campbell, Robt. J., Cull, Castle-Douglas
1879 Cannon, James, Urroch, Castle-Douglas
1878 Carr, Robert, Felkington, Norham, Ber-
wick-on-Tweed
1887 Carrington, George, M.R.A.C., Missenden
Abbey, Great Missenden, Bucks
1884 Clinton, W. E., Palham, Moorcourt,
Stroud
1891 Coward, T. A., Eden Town, Carlisle
1890 Crabtree, Henry, 54 Wakehurst Road,
Clapham Junction, London, S.W.
1879 Craig, John, Innergeldie, Comrie
1880 Craig, Wm., Gwydyr House, Crief
1887 Davies, Edward Smith, Claverley,
Bridgenorth, Shropshire
1886 Dickson, Thos. A., Estate Office, Over-
stone Park, Northampton
1888 Driesberg, Christopher, Colombo, Ceylon
1892 Duncan, James L., Birgidale, Knock,
Rothsay

Admitted

- 1878 Dunlop, Andrew T. L., Morriston, May-
bole
1873 Eley, Rev. Dr Wm. Henry, Etchingham
Rectory, Hawkhurst, Kent
1873 Elliot, Prof. Thomas John, M.R.A.C.,
Hole Park, Rolvenden, Kent
1882 Ensor, Thomas Henry, 54 South Street,
Dorchester
1874 Erskine, Henry, Buccleuch Square,
Langholm
1886 Faber, Alfred D., Belmont, Ilfracombe,
Kent
1889 Farquharson, A. J., Newtyle, Forfarshire
1876 Ferguson, Archd. A., 196 High Street,
Portobello
1891 Fleet, W. J., Estate Office, Thurlow,
Suffolk
1891 Forbes, A. C., The Home Farm, Baward,
Calne, Wilts
1885 Gibb, Robert Shirra, Boon, Lauder
1873 Giglioli, Italo, M.R.A.C., Portici
1889 Gilchrist, D. A., University College of
North Wales, Bangor
1873 Goddard, H. R., M.R.A.C., Belsay, New-
castle-on-Tyne
1889 Gordon, Robert, Gordonston, Clatt,
Kennethmont
1881 Gover, Lawford D., 6 Broadwater Road,
Worthing
1892 Greig, Robert Blyth, Balcurvie, Windy-
gates, Fife
1887 Haig, Robt., Dollarfield, Dollar
1883 Hamilton, H. W., late Uffington, Stan-
ford
1884 Hardy, C. W. L., Gittesham, Hontton
1878 Henderson, John, Oakfield, Kingsbury,
Middlesex
1874 Henderson, Richard, Portland Estates
Office, Kilmarnock
1881 Henderson, W., East Elrington, Hexham
1878 Hill, Arthur James, M.R.A.C., Account-
ant 36 Lansdowne Road, London, W.
1886 Hooper, Cecil H., Highlands Farm,
Swanley, Kent
1879 Hunt, A. E. Brooke, Holmsley, Slough,
Bucks
1888 Inman, A. H., care of Glyn, Mills, Currie,
& Co., 67 Lombard St., London, E.C.
1891 Irving, Robert James, Blackhole House,
Carlisle

List of Members.

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Admitted

- 1890 Jeffrey, John J., Blackadlie, Sanquhar
 1878 Jukes, R. F., M.R.A.C., Harley, Much Wenlock
 1875 Kennedy, William, M.R.A.C., Lewes and County Club, Lewes, Sussex
 1800 Kerr, James, Schatzl Station, Ramleh, Egypt
 1889 Ledingham, J. K., Slap, Turriff
 1891 Lister, Joseph, Little Broughton, Carlisle
 1885 Lowrie, Wm., Prof. of Agriculture, Roseworthy, So. Australia
 1878 M'Connell, Primrose, Ongar Park Farm, Ongar, Essex
 1878 M'Cracken, William, Crewe
 1876 Maconchy, John Arthur, M.R.A.C., Kildare Street Club, Dublin
 1885 Macdonald, A. C., Department of Agriculture, Grahamstown, Cape of Good Hope
 1886 M'Minnies, Henry H., Farington, Preston
 1887 Maitland, Harry Reid, Muirfold, Grange, Keith
 1884 Malcolm, John, M.R.C.V.S., Birmingham
 1880 Martin, Wm., Dardarroch, Dumfries
 1889 Middleton, T. H., Baroda College, Baroda, India
 1878 Milne, John, Inverurie
 1886 Moos, N. A. F., Poona, Bombay
 1888 Muir, James, Yorkshire College, Leeds
 1880 Mukerji, Nitya Gopal, Bhowanipur, Calcutta
 1873 Munby, Edward Charles, M.R.A.C., The Hermitage, Oswaldkirk
 1891 Munro, Duncan, 8 Dalrymple Place, Edinburgh
 1875 Murdoch, George Burn, M.R.A.C., 81 Morningside Road, Edinburgh
 1891 Murray, John, The Muir, Laurencekirk
 1875 Murray, Robert W. E., Blackford House, Blackford Avenue, Edinburgh
 1878 Nonnan, John Edward, Norway
 1878 Norman, Wm., M.R.A.C., late Hall Bank, Aspatia
 1882 Norrie, William, Cairnhill, Monquhitter, Turriff
 1888 Perkins, Walter Frank, M.R.A.C., Portwood House, Southampton
 1877 Pudney, R. L., M.R.A.C., Dookie Farm School, Cashel, Victoria, Australia

Admitted

- 1889 Purefoy, Edward B., Greenfields, Tipperary
 1889 Raeburn, Norman, 49 Manor Pl., Edinburgh
 1882 Reid, Peter, Port Ellen, Islay
 1888 Robertson, Chas. T. A., Little Horringer Hall, Bury St Edmunds
 1878 Rome, Thomas, M.R.A.C., Charlton House, Charlton Kings, Cheltenham
 1890 Rudd, Ash, East Ruston Hall, Stalham, Norwich
 1881 Sandison, Marcus, Hempriggs, Wick
 1892 Scheult, L. C., Santa Rosa, Arima, Trinidad
 1890 Sessions, Harold, Russell House, Gloucester
 1878 Sharp, J. J., Ewingston, Gifford
 1882 Smith, E. Hedley, B.L., Whittinghame, Prestonkirk
 1888 Smith, J. R. C., Mowhaugh, Kelso
 1873 Smith, William B., M.R.A.C., late 32 Ashchurch Grove, London
 1892 Solomon, F. O., North Eastern County School, Barnard Castle
 1887 Somerville, William, B.Sc., Professor of Agriculture and Forestry, Durham College, Newcastle-on-Tyne
 1887 Steele, Daniel, Agricultural Manager, Lake Copais Company, Ltd., Athens Agency, Athens, Greece
 1891 Stevens, Alex. Buchan, Mains of Kilgraston, Bridge of Earn
 1876 Sutherland, Alex., Rampyards, Watten, Caithness
 1888 Tiffen, J. H., M.R.A.C., 4 Grosvenor Terrace, Hull
 1878 Wall, G. Y., M.R.A.C., Durham
 1878 Wallace, Prof. Robert, University, Edinburgh
 1878 Walton, George Kent, Long Campton, Shipston-on-Stour, Warwickshire
 1888 Watson, H. A., U.F. Mansie, Forres
 1881 Weber, F. H., 41 High Street, Guildford
 1891 White, W. E. C., Elsham Brigg, Lincolnshire
 1878 Wilson, Sir Jacob, M.R.A.C., Chillingham Barns, Alnwick
 1892 Wilson, James, jun., University College of Wales, Aberystwyth
 1870 Wilson, John, jun., Gilbrea, Oakville, Ontario
 1892 Wilson, William, Goodyhills, Maryport
 1882 Wright, Robert P., Downan, Ballantrae, Ayrshire

NUMBER OF FREE LIFE MEMBERS, 110.

LIST OF HOLDERS OF FIRST-CLASS CERTIFICATE IN FORESTRY, FREE LIFE MEMBERS.

- 1892 Baillie, Wm., The Nurseries, Haddington
 1892 Gibson, A. H., Kirkcaldy
 1892 Inglis, Alex., Greenlawdean, Greenlaw
 1892 Loney, Peter, Marchmont, Duns
 1892 Menzies, John C., Bankhead, Duns
 1892 Robertson, Wm., Blinkbonny, Earlston
 1892 Wilson, John Hardie, D.Sc., F.R.S.E., Royal Botanic Garden, Edinburgh

NUMBER, 7.

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